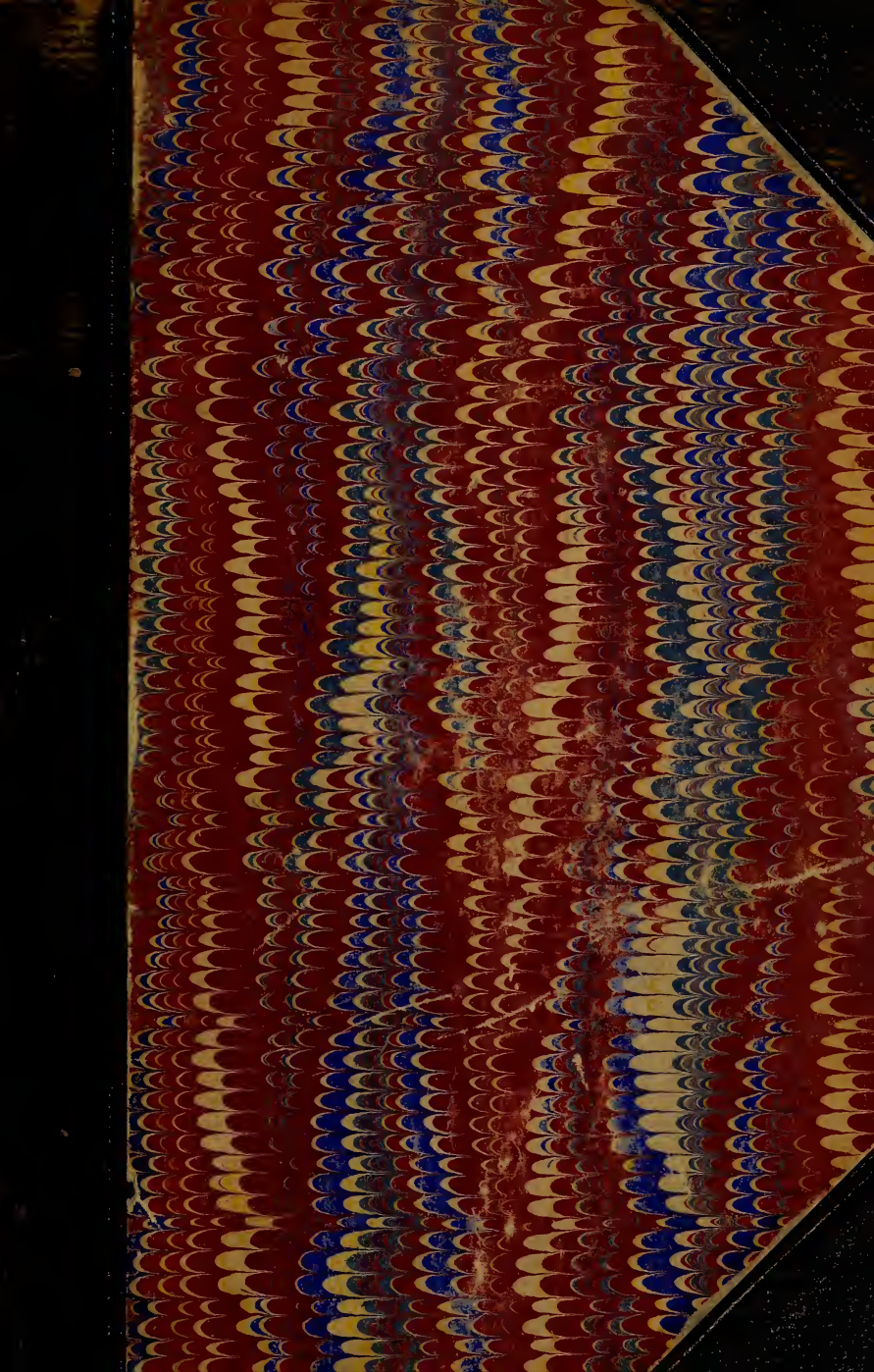


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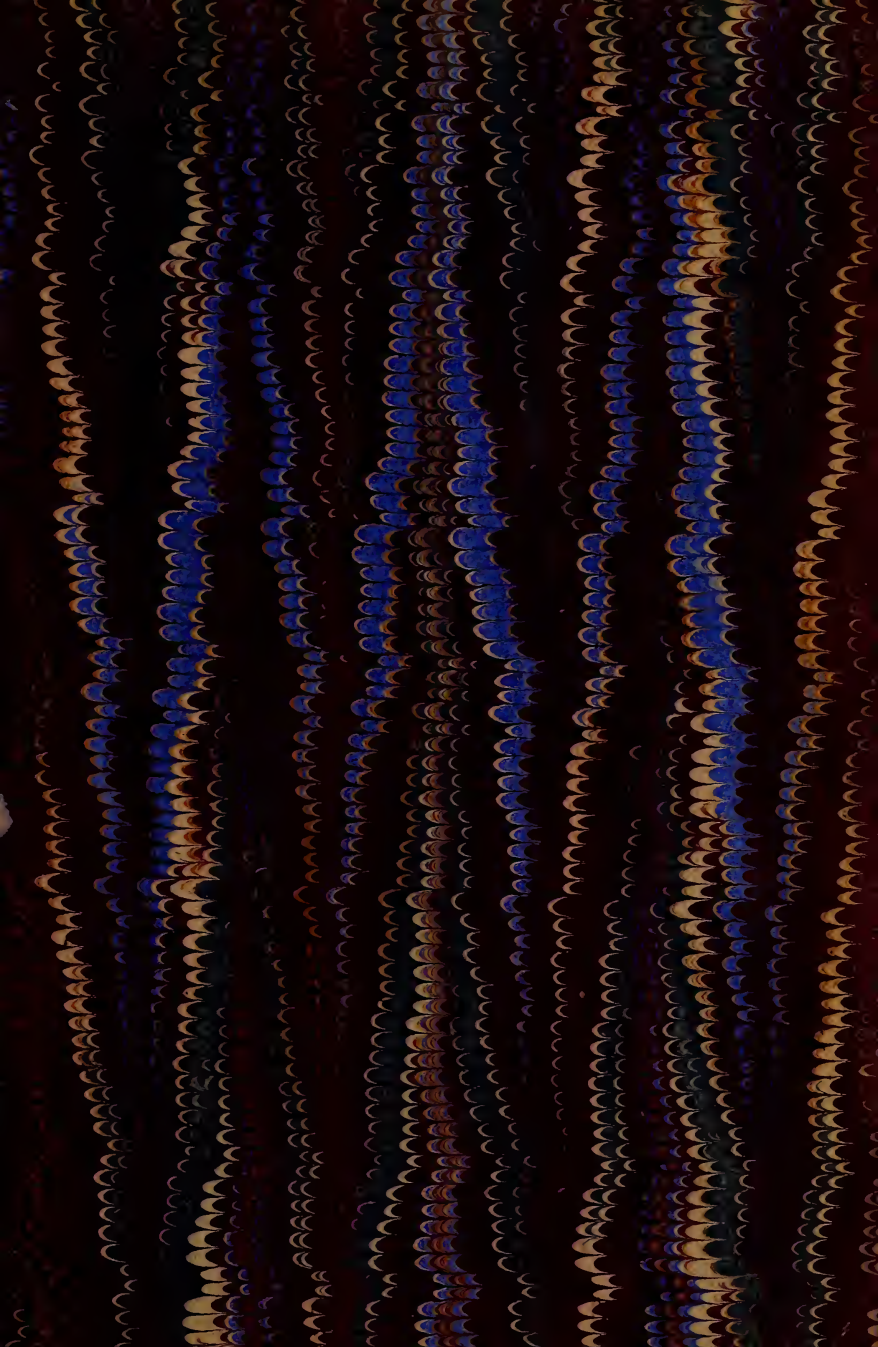
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Food *and* Dietetics

PART I

LESSON PAPER

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American School of Household Economics

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FOOD AND DIETETICS

THE problems of the household are more difficult to-day than they have ever been, for each advance in science, each modern invention, has brought in its train new responsibilities and new duties. In every department of the administration of the home more knowledge and skill are required than ever before. With the increase of conveniences has come increased care. Standards of living have changed as well, and greater perfection in all household service is demanded of the home-maker.

Problems
of To-Day

We still carry on in the household many of the numerous trades that were formerly a part of the home life, as cooking, cleaning, laundry work, sewing. At the same time more close supervision of the life of the children, mental, moral and physical, is required; more knowledge is needed to control materials if we would have that power over our environment which makes us the masters and not the slaves of our belongings; and the social demands upon time and strength can not be ignored.

If to-day we would lead "the simple life," it must be as a result of determined effort, often in the face of more or less conscious opposition on the part of relatives and friends and of society in general.

The
Simple
Life

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**Essentials
and Non-
Essentials**

Yet a simpler life is not to be attained by ignoring the results of science, and refusing to apply the knowledge made available by the investigator; but rather by making use of every help that will give knowledge of the materials with which we work, that will cultivate the power to distinguish between the essential and the non-essential, and that will give control of the situation.

**The Food
Problem**

The food problem is perhaps the most difficult of all the physical problems that present themselves in the household, partly because it is so vital to the welfare of the family, and partly because it is so inclusive. The food question once meant the providing something palatable and presumably wholesome at a cost within one's means. To-day it implies a knowledge not only of the cost and nutritive value of food materials, their composition and digestibility; but of the balanced ration, the proportion of different food principles necessary for perfect nourishment, and of the way in which this proportion should be varied to suit the needs of the child or of the aged, of the laborer, or of the student. An understanding of the principles involved in the preparation of food is demanded, as well as a knowledge of food adulterations that will insure pure food materials.

The importance of the question can scarcely be exaggerated. Mrs. Ellen H. Richards tells us that "the prosperity of a nation depends upon the health and morals of its citizens; and the health and morals of

a people depend mainly upon the food they eat, and the homes they live in. Strong men and women can not be raised on insufficient food; good tempered, temperate, highly moral men can not be expected from a race which eats badly cooked food, irritating to the digestive organs and unsatisfying to the appetite. Wholesome and palatable food is the first step in good morals, and is conducive to ability in business, skill in trade, and healthy tone in literature."

It is quite true that we may put food in a wrong position, making it an end rather than a means in living. We should eat to live, not live to eat. Yet we must keep in mind that right food, clothing and shelter are the primary conditions of health, and that health is essential to the most complete happiness and to the highest usefulness.

Some one has said that "well dressed men and women, well fed men and women, are still an ethical possibility of the future." However this may be in regard to dress, certainly an age that has devoted so much time and thought to feeding on the stock farm, so much attention to the right nutriment for plants, and that has solved so many difficult problems in these directions, should be able to lay down the principles which govern the diet of human beings.

While the food question then is by no means the one thing in housekeeping as it is apparently so often considered, it yet is of real and vital importance; and the housekeeper who desires to make the most of her

A Means
to an End

Importance
of the
Food
Problem

opportunities to contribute to the extent of her ability to the welfare of her family, should master the principles of diet so far as they are known, should keep an open mind toward new knowledge, and should apply with discretion and intelligence the knowledge now available in this direction.

THE COST OF FOOD

The first practical question that will appeal to the housekeeper in regard to food is its cost. Long before she asks what proportion of carbohydrate, of fat, and of proteid she must provide for her family, the question, "What shall I spend for food?" appeals to her, and indeed she is often forced by absolute necessity to decide the question. Later, "How shall I spend?" will be the important problem.

Two main questions are involved. First, What proportion of the family income may go for food? What is the relation of the expenditure for food to that for rent, for clothing, for travel and amusement, for books and education? Second, What is the minimum cost per individual of food sufficient to give necessary nourishment? How much shall this minimum cost be exceeded for the sake of added attractiveness, increased digestibility, or adaptation to individual taste?

Proportion
of Income
for Food

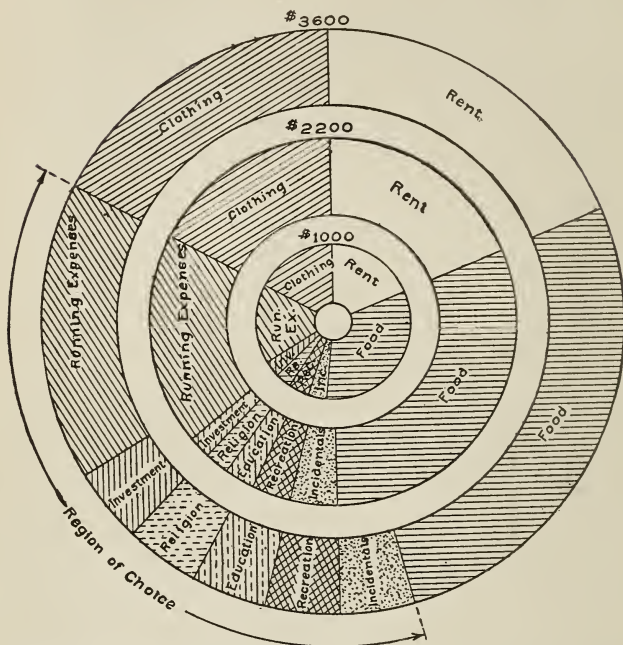
Nor is the cost of food a question of raw material alone. The amount of waste must be considered, the cost of the fuel used in cooking, and the cost of service. These often triple the original cost of the food.

Raw Food
Only Part
of Cost

Mr. Atkinson has said that half the cost of life is the price of food. This broad statement is true only in the case of the small income. A fairer interpretation of the matter is given by Dr. Engel, who has formulated four laws that in the main seem to hold, both in ideal and actual budgets. As quoted in *The*

DIVISION OF INCOME CHART

Typical Family of Two Adults and Three Children



Running Expenses include Wages, Fuel, Light, Ice, Etc. With \$1,000 Income the Children Would be Educated in the Public Schools.

The above chart was adapted from a large colored chart prepared under the direction of Mrs. E. H. Richards for the Mary Lowell Stone Exhibit on Home Economics.

Cost of Living, the first of these laws is "that the proportion between expenditure and nutriment grows in geometric progression in an inverse ratio to well-being; in other words, the higher the income, the smaller is the percentage of the cost of subsistence." That is, while clothing, rent, heating and lighting keep a nearly invariable proportion, whatever the income, the proportion expended for food varies from sixty per cent in an income of three hundred dollars to twenty-five per cent or less in the three thousand dollar income.

In discussing the amount of money needed for food, it is usual to consider the amount expended for each individual per day. How much is necessary to supply the required nourishment depends upon various factors. The locality will be important. As a rule, country prices are lower than those in the city, while in different sections of the same city there may be wide variation. Eastern prices differ from those of the middle west, and these again from those prevalent in the far west or the south. In institutions where food is purchased in large amounts, the cost is less per person than in the individual household. An absolutely definite statement is, therefore, impossible, but a number of experiments have shown that a sufficient amount of the simplest raw food material may, under favorable circumstances, be furnished for from eight to ten cents a day per person. This implies the absolute exclusion of all but the cheapest materials. Fifteen cents for

Cost per
Person
per Day

each person means a less limited choice in raw materials, but the most careful management and the strict denial of anything approaching luxury. For twenty-five cents a day, one may add to the dietary a limited amount of fresh fruit and vegetables in season, coffee and other beverages, a fair supply of milk, and may furnish a satisfactory variety of food, while forty cents per person gives an excellent table with added luxuries, though it will not purchase fruit out of season, such as strawberries in January, nor give an unlimited supply of high priced game and similar delicacies.

Standards

In deciding what one of these standards to adopt, the number of members in the family and the total amount of income must be considered. The typical economic family, on which estimates are made, is one of five members, two adults and three children, or four adults. The real family often has six or eight members, and this additional number must modify the application of economic theories to real life.

True
Food
Economy

It is not desirable to cut down the expenditure for food to the lowest point at which nutritive food may be obtained if the income justifies a larger expenditure. *Economy does not mean spending a small amount, but expending money in such a way that it may bring in the largest return.*

Cost of
Cooking

The cost of cooking modifies the expenditure for raw material. Often a cheap food, requiring long cooking, is in the end more expensive than a higher priced food requiring only a short cooking. This dif-

ference is particularly marked in the case of such a fuel as gas. With a coal stove careful planning for the utilization of all the heat may mean only the difference between the wasting of heat and the using of it. For example, the beans baking in the oven while ironing is going on add practically nothing to the amount of fuel used, while the beans baked in the gas oven must have the cost of the gas consumed added to their cost. It is quite possible that a cheap, tough piece of meat might consume so much gas in the long cooking necessary to stew it that its cost would be raised nearly to that of the more expensive cut that it supplanted.

Another element in the cost of food is that of the labor consumed in preparation and in service. The time taken to prepare a certain dish must be added to the cost of the raw materials before we can fairly estimate the cost of that dish. It must be remembered, however, that a dish requiring long cooking does not necessarily involve the expenditure of much time in preparation.

Cost of
Labor

In a certain hotel having a large number of guests it was estimated that the extra time required to add a sprig of parsley to each plate of meat served meant the employment of an additional helper for the equivalent of one day a week. In the private family, the difference between a dinner served in three courses, or in four, means an expenditure of additional time that has a definite money value.

**Waste
of Food**

The waste of food must also be considered. This is of two kinds, necessary waste, and needless waste. It is foolish to say, as some have done, that the garbage can might be eliminated from our houses if greater care were taken. The parings of potatoes, the husks of corn, the pods of peas, must always be refuse. In one experiment it was found that because of the cost of service, it was cheaper to allow thick parings of potatoes to be thrown away than to pay for the care that would insure thin parings. On the other hand, the head of a certain institution found that the careful paring of the potato meant the actual saving of a large number of bushels each year. Mrs. Richards says, "It is not food actually eaten that costs so excessively; it is that wasted by poor cooking, by excessive quantity and by purchase out of season when the price is out of all proportion to its value.

**Amount
Harmony
Flavor**

"Good judgment as to the amounts to be prepared, as to the harmony of the meal, the blend of flavor; as to the right appetizers; and good humor and cheerful conversation, with the most attractive setting and perfect serving, will cut down the cost of almost any table one-half. Many seem to hold the idea that hospitality requires the setting of a double portion before the guests, and this alone doubles the cost of food in some families."

She says again, "In no other department of household expenditure is there so great an opportunity for the exercise of knowledge and skill with so good re-

sults for pocket and health; no item of expense is so fully under individual control."

On the other hand, Thudicum, in his *Spirit of Cookery*, refers to "the delusion of economical cookery with scraps costing nothing." He speaks of what is termed "the fearful waste in English kitchens," and says, "When we proceed to investigate the items of the alleged waste, we find them to consist of stale lumps of bread, bacon rind, and bare bones of boiled or roast joints." He quotes with scorn and denial a prominent medical journal which says, "The French cook makes excellent and nutritious soup out of materials which the English housewife throws away as useless; while her pot-au-feu is composed of stray scraps carefully husbanded, which cost her nothing, but which, when skilfully combined, constitute a useful and inexpensive food."

**Economical
Cookery**

Perhaps the truth lies between the two extremes. To set an attractive table costs something in raw food material, in equipment and in service. The snowy table cloth, always spotless, so often suggested in newspaper articles as a substitute for expensive food, means the expenditure of time, money and energy. The soup made from "scraps" involves expenditure of time and fuel, if not of money with which to purchase fresh material. The cost of saving may outweigh the cost of material saved. But that there is much unnecessary waste in the average household can not be denied. Nor is the mere money value of the

True Cost

material wasted the most serious part. The habits of carelessness and extravagance engendered show themselves in a lack of responsibility for material and indifference toward useless expenditure of time and energy as well as money, and in general thoughtlessness.

Conditions
Alter
Cases

How the money to be expended shall be distributed between different food materials must be largely a matter for the individual housekeeper since conditions vary so greatly. As a rule, vegetable foods are cheaper than animal. This may be counter-balanced by the more easy digestibility of the animal food, as we shall see in a later discussion. Whether one food or another is the cheaper source of a particular food principle depends upon the percentage composition and comparative cost of these foods. As is seen in Table I, potatoes at two cents per pound, i. e., 30 cents per peck, cost almost twice as much, so far as actual food value is concerned, as rice at five cents per pound. When rice is ten cents per pound, as it is in many places at present, and potatoes are one cent a pound, conditions are reversed. Sweet potatoes at five cents a pound must be definitely considered as a luxury when white potatoes may be had for one cent at the same place.

TABLE I

Some Important Foods Considered as to Their Nutritive and Economic Values.

	Refuse, per cent.	Water, per cent.	Proteid, per cent.	Fat, per cent.	Carbohy- drates, per cent.	Calories, per lb.
Nuts (peanuts, edible por- tion)		9.2	25.8	38.6	24.4	2560
Sugar (granulated)					100	1857
Cornmeal (bolted)		12.9	8.9	2.2	75.1	1655
Wheat flour (roller process)		12.5	11.3	1.1	74.6	1645
Rye flour		12.7	7.1	.9	78.5	1630
Rice		12.4	7.8	.4	79	1630
Legumes (dried)		13.2	22.3	1.8	59.1	1590
Meats (as purchased about) ..	12	55	16	1.5		928
Fish (fresh)	30	45	12	.4		388
Potatoes	15	67.1	1.8	.1	15.3	325
Milk		87	3.3	.4	5	325
Bananas	40	44.5	.7	.5	13.7	290
Fruit (apples, grapes, etc.) ..	25	60	1	.9	12.9	285

Wheat flour at 2 cents per pound furnishes 3009 calories for 3.6 cents.	
Cornmeal at 3 " " " " " " " " 5.4 "	
Wheat flour at 4 " " " " " " " " 7.2 "	
Rice at 5 " " " " " " " " 9.2 "	
Potatoes at 1 " " " " " " " " 9 "	
Legumes at 8 " " " " " " " " 15 "	
Milk at .2 " " " " " " " " 18 "	
Potatoes at 2 " " " " " " " " 18 "	
Nuts(kernels)at 16cents " " " " " " " " 19 "	
Cheese (American pale) at 14 " " " " " " " " 20 "	
Fruit at 2 cents per pound " " " " " " " " 21 "	
Milk at 3½ (7 cents a qt.) " " " " " " " " 32 "	
Beef (medium fat) at 15 cents (15% bone) " " " " " " " " 47 "	
Beef (sirloin) at 25 cents per pound " " " " " " " " 69 "	
Eggs at 25 cents per dozen " " " " " " " " 115 "	

(From *The Cost of Food*, by Mrs. Ellen H. Richards.)

**Finding
the Cost
of Food**

The most satisfactory way to get at the cost of food per individual in a family is to keep careful accounts over a considerable period of time, both of the actual expenditure for food, and of the number of meals served. To make an experiment for a definite time, one month for instance, look over the material on hand, estimating as accurately as possible the amounts of flour, of sugar, of spices, etc. At the end of the month, again take account of stock and estimate the value of the materials on hand. Add the difference if there is less, and subtract the difference if there is more, to the amount expended during the month, and the result will be the cost of the food.

The following tables are records of actual expenditure for food. Table II gives the expenditure in two institutions in an eastern city, where, under the direction of an expert, effort was made to provide a sufficient amount of food at the lowest price.

The left-hand table gives the expenditure for food in a house of correction and the right-hand table for that in an orphans' home. In this table it will be noticed that one of the largest expenditures was for milk. The cost for food at the officers' table was about the same in both institutions. Provisions were bought at wholesale prices.

TABLE II

Average Daily Cost of Food Materials per Person in Two Public
Institutions in Boston.

	Inmates	Officers	Inmates	Officers
Number of Persons Fed.....	523	73	333	35
	Cents	Cents	Cents	Cents
Meat and fish (fresh or salt).....	4.67	23.13	1.59	19.60
Eggs.....		1.14		1.29
Cheese.....		0.26	0.16	0.20
Milk.....	0.93	3.13	3.75	5.02
Butter and Lard.....		3.16	0.07	2.97
Flour, cornmeal, crackers.....	2.22	0.75	1.88	1.19
Oatmeal, hominy, rice.....	0.46	0.12	0.27	0.35
Peas, Beans.....	0.26	0.04	0.12	0.11
Tapioca, sago, cornstarch.....		0.04	0.04	0.08
Sugar.....	0.62	0.67	0.29	1.27
Dried fruits.....		0.06		0.24
Potatoes.....	0.38	0.57	0.17	0.53
Fresh vegetables.....	0.26	0.48		0.38
Apples.....	0.02	0.26		0.11
Molasses.....	0.04	0.04	0.03	0.06
Cost per day per person.....	9.86	33.85	8.37	33.40

(From Report of Institutions Commissioner of the City of Boston
for 1897.)

Table III is a record from the middle west, and is taken directly from the expense account of three college girls who were trying to keep the cost of living as low as possible. There is no pretense to an ideal diet. Probably it was low in proteid, but the girls lived and apparently thrived upon it.

Experience
of College
Girls

TABLE III

Weekly Expense Account for Food for Three People.

<i>Second Week in October, 1903.</i>		<i>Third Week in October, 1903.</i>	
Navy Beans.....	.25	Bread.....	.05
Sardines.....	.05	Grapes.....	.35
Butterine.....	.20	Bananas.....	.15
Meal, corn.....	.20	Raisins.....	.10
Apples.....	.20	Crackers.....	.10
Bananas.....	.10	Bread.....	.10
Bread.....	.10	Cheese.....	.20
Flour.....	.10	Meat.....	.13
Crackers.....	.10	Milk.....	.51
Potatoes.....	.25	Meat.....	.15
Beef.....	.40	Cranberries.....	.10
Salt pork.....	.07	Cranberries.....	.10
Bread.....	.20	Crackers.....	.10
Butter.....	.13	Oleo.....	.20
Butter.....	.20	Pork.....	.05
Prunes.....	.05	Bread.....	.10
Celery.....	.05	Salt.....	.10
Milk.....	.51		
	\$3.16		\$2.59
<i>Second Week in April, 1904.</i>		<i>Third Week in April, 1904.</i>	
Bread.....	.15	Soda crackers.....	.10
Pork, fat.....	.05	Crackers.....	.10
Radishes.....	.05	Can Tomatoes.....	.10
Cookies.....	.15	Ham.....	.15
Grapes.....	.20	Bread.....	.05
Crackers.....	.10	Oranges.....	.20
Bread.....	.05	Beans.....	.05
Honey.....	.12	Crackers.....	.10
Beefsteak.....	.10	Eggs.....	.18
Crackers.....	.20	Flour.....	.10
Bananas.....	.08	Bread.....	.05
Oranges.....	.10	Apple butter.....	.10
Lettuce.....	.05	Nuts.....	.03
Beef, boil.....	.30	Macaroni.....	.15
Potatoes.....	.40	Sugar.....	.25
Bread.....	.05	Blackberries.....	.20
Strawberries.....	.10	Beans.....	.05
Bread.....	.05	Pork steak.....	.10
Milk.....	.51	Pickles.....	.10
Apple butter.....	.10	Hamburg steak.....	.15
	\$2.91	Butter.....	.25
		Milk.....	.51
			\$3.07
Total cost for three people for twenty-eight days.....		\$11.83	
Average cost for one person for one day.....		0.141	

Table IV shows the expenditure in a summer home in the mountains. In this case no effort was made to reduce expense by excluding articles desired, but true economy was practiced in careful planning of meals and in utilizing all material.

Liberal
Table with
High Prices

TABLE IV

Expenditure During the Summer of 1903, in a Mountain Town in New England, Some Miles from a Railroad.

	Lbs.	Proteid	Fat	Carbohydrate
Fish.....	44.5	5.9345	2.057	.....
Meats.....	83.88	24.259	25.9495	.....
Soups.....	4.	.088	.022	.....
Dried Fruit.....	3.5	.0805	.1065	2.6735
Dairy.....	343.1	13.616	49.681	14.354
Cereals.....	28.	2.3775	.3615	19.099
Bakeries.....	16.	1.352	1.327	10.597
Sugar and starches	151.16	11.680	3.719	116.717
Fruit.....	87.	.564	.303	11.349
Vegetables.....	250.5	8.915	3.775	36.06
293 Days (1 person)	1011.64	68.866	87.444	210.8495
Each day per person	3.45 lbs.	106.5 grams	135.17 grams	326.1 grams
		3.76 oz.	4.78 oz.	11.51 oz.

Total cost, \$114.14. Cost per day, per person, \$0.39.

The number of meals served was 878. This is taken as equivalent to 293 days for one person.

The prices of some of the chief articles of food are given here.

Beef roast....20 cents per pound	Salmon.....30 cents per pound
Beef steak....28 " " "	Haddock.....6 " " "
Lamb roast...18 " " "	Potatoes 20 and 25 cents per peck
Lamb chops..25 " " "	Cream.....25 cents per quart
Veal ".....20 " " "	Milk.....5 " " "
Chicken.....25 " " "	Butter.....28 " " pound
Fowl.....20 " " "	Eggs...28 and 30 cents per dozen
Halibut.....16 " " "	

The following tables give in detail the weight and composition of the various food used.

Fish

	Lbs.	Prot.	Fat	Carb.
Mackerel.....	12½	1.275	.525	.....
Salmon.....	4	.612	.356	.....
Halibut.....	6	.918	.264	.....
Haddock.....	8¼	.693	.0165	.....
Dressed Cod.....	2	.222	.004	.....
Lobster.....	1½	.0835	.003	.....
Blue fish.....	2¼	.225	.0135	.....
Cod (salt).....	3	.762	.009	.....
Herring.....	2	.224	.078	.....
Sardines.....	4	.92	.788	.....
	44.5	5.9345	2.057	.....

Meats

	Lbs.	Prot.	Fat	Carb.
Steak.....	14¼	3.405	1.4535	.....
Lamb.....	12¾	7.006	9.799	.....
Veal.....	4¾	.954	.357	.....
Chicken.....	13⅞	2.984	.346	.....
Pork (salt).....	1½	.106	1.002	.....
Ham.....	14¾	2.978	3.304	.....
Fowl.....	2½	.482	.407	.....
Bacon.....	4½	4.095	2.6685	.....
Lard.....	5		5.000	.....
Sl. Ham.....	1	.192	.162	.....
Pot. Ham.....	1	.095	.1705	.....
Chicken.....	1	.128	.014	.....
Corn beef.....	4	1.052	.748	.....
Dried beef.....	1	.392	.054	.....
Tongue, Ox.....	2	.390	.464	.....
	83.88	24.259	25.9495	.....

Soup

	Lbs.	Prot.	Fat	Carb.
Julienne.....	1	.027		.....
Tomato.....	2	.036	.022	.....
Corn.....	1	.025		.....
	4	.088	.022	.....

Dried Fruit

	Lbs.	Prot.	Fat	Carb.
Seed raisins	3	.078	.099	2.283
Citron.....	$\frac{1}{2}$	.0025	.0075	.3905
	$3\frac{1}{2}$	.0805	.1065	2.6735

Dairy

	Lbs.	Prot.	Fat	Carb.
Eggs.....	27.6	3.643	3.312	.....
120 qts. milk	240.	7.920	9.60	12.00
19 $\frac{1}{4}$ qts. cream.....	38.5	.962	7.022	1.732
Cheese	3.	.751	.847	.622
Butter	34.	.34	28.9	
	343.1	13.616	49.681	14.354

Cereals

	Lbs.	Prot.	Fat	Carb.
Rice.....	$4\frac{1}{2}$	.126	.004 $\frac{1}{2}$	1.098
Wheat.....	4	.484	.072	3.008
Sh. Wheat	1	.105	.014	.779
Farina.....	1	.11	.014	.763
Corn Meal.....	12	1.104	.228	9.048
Hominy	$3\frac{1}{2}$	.290 $\frac{1}{2}$	.021	2.765
Rice Fl.....	2	.158	.008	1.638
	28	2.377 $\frac{1}{2}$	.361 $\frac{1}{2}$	19.099

Bakeries

	Lbs.	Prot.	Fat	Carb.
U. Biscuits.....	2	.196	.182	1.462
Bread	6	.486	.414	3.252
Gin. Snaps.....	2	.130	.172	1.52
Van. Cr.....	1	.066	.140	.716
Mis. Cookies	2	.134	.192	1.448
Water Cr.....	2	.234	.10	1.514
Saltines.....	1	.106	.127	.685
	16	1.352	1.327	10.597

Sugars and Starches

	Lbs.	Prot.	Fat	Carb.
2 qts. Molasses	6	.144		4.158
Sugar	40			40.
1 gal. Syrup	8			11.016
Maccaroni	1	.402	.027	2.223
S. D. Flour	70	7.70	.63	42.08
F. M. Flour	15	2.07	.285	10.785
Rye Flour	3	.204	.027	2.361
Spaghetti	2	.242	.008	1.526
Honey	2	.008		1.624
Chocolate	2½	.322	1.217	.657
Almonds	1⅓	.588	1.525	.287
	151½	11.680	3.719	116.717

Fruit

	Lbs.	Prot.	Fat	Carb.
Oranges	3	.024	.006	.348
Lemons	6	.06	.024	.510
Currants	1	.015		.128
Raspberries	1	.017	.01	.126
Melons (12)	12	.036		.552
5 doz. peaches	7	.05		.03
Apples	25	.100	.125	3.550
Plums	2	.02		.402
Bananas	1½	.019	.009	.55
Box berries	1	.017	.01	.126
Grapes	5	.065	.08	.960
3 pears	½	.003	.002	.071
2 pineapples	4	.016	.012	.388
3 canteloupes	3	.009		.138
Canned peaches	4	.028	.004	.432
Pears	1	.003	.003	.180
Cherries	4	.044	.004	.844
Gr. Mar	2	.012	.002	1.690
Quince	2	.014	.002	.216
Currants	2	.012	.012	.108
	87	.564	.305	11.349

Vegetables

	Lbs.	Prot.	Fat	Carb.
Sweet Pot.....	31	.93	.656	13.051
Beets.....	30	.480	.03	2.910
Potatoes.....	82½	2.062	.26	5.430
Peas.....	29	2.03	1.18	4.901
Beans.....	5	.115	.15	.370
Squashes.....	2	.028	.01	.180
Cabbage.....	10	.160	.30	.560
Tomatoes.....	20	.18	.08	.780
Carrots.....	2	.022	.008	.186
Olives.....	1	.008	.202	.08
Mushrooms.....	2	.07	.008	.136
Baked beans.....	20	1.38	.800	3.920
Asparagus Tips.....	10	.210	.330	.220
Corn.....	1	.031	.011	.197
Split Peas.....	4	.984	.04	2.480
Dried beans.....	1	.225	.015	.659
	250.5	8.915	4.08	36.060

As an example of fairly attractive menus with low priced foods, the following extract from Bulletin No. 129 of the Office of Experiment Station, U. S. Department of Agriculture, by Miss Bertha M. Terrill, may be of interest:

A Typical Investigation

"In February, 1902, the students of the Bible Normal College, situated then in Springfield, Mass., voted to save a sum of money, which they desired to raise for a special object, by reducing the cost of their table board. They had been paying \$3 per week for table board at the time, or very nearly 43 cents per person per day, which of course included the cost of fuel, preparation, and service, estimated to be 10.6 cents per person per day. Learning that it has been found possible to provide a balanced and nourishing diet for 10 cents per man per day for the raw food, they entered eagerly into an experiment with a diet to cost that amount for food materials only, the cost of prep-

aration, etc., to remain the same as before, making the total cost of the daily food as served 20.6 cents per person, or 22.4 cents less than their ordinary diet. There were 30 students interested in this project, and it was planned to continue the investigation three days, as this would suffice to save the \$20 desired." * *

The menus for the different days covered by the study were as follows:

SATURDAY, FEBRUARY 8.

Breakfast.—Oatmeal and top of milk, fish cakes, toast (with a little butter), prunes, milk and cereal coffee.

Dinner.—Beef soup, croutons, beans (baked with pork), brown bread, apricot shortcake.

Supper.—Sandwiches (cheese and jelly), white and graham bread (no butter), sliced bananas, milk.

SUNDAY, FEBRUARY 9.

Breakfast.—Corn-meal mush and top of milk, baked beans, buns, milk and cereal coffee.

Dinner.—Split-pea soup and crackers (crisped), potted beef, brown sauce, baked potatoes, bread, rice with milk and sugar.

Supper.—Brown-bread sandwiches (with a little butter), white-bread sandwiches with date and peanut filling without butter, cocoa, popcorn salted.

MONDAY, FEBRUARY 10.

Breakfast.—Oatmeal with top of milk, cream toast, cereal coffee.

Dinner.—Baked-bean soup, crisp crackers, Hamburg steak balls, brown sauce, hominy, turnip, peanuts and dates.

Supper.—Potato and beet salad, gingerbread, cheese, bread, milk.

TUESDAY, FEBRUARY 11.

Breakfast.—Wheat breakfast food and dates, creamed codfish muffins (with little butter), milk and cereal coffee.

Dinner.—Beef Stew with biscuits, bread pudding, bread.

Supper.—Scalloped meat and potato, bread (with butter), prunes chocolate candy "fudge."

WEDNESDAY, FEBRUARY 12.

Breakfast.—Oatmeal with top of milk, hash, corn cake, milk and cereal coffee.

Dinner.—Vegetable soup, croutons, baked stuffed beef's heart, brown sauce, rice, cornstarch blanc mange, caramel sauce.

Supper.—Potato and celery salad, white and graham bread, fried corn-meal mush, sirup, -

THURSDAY, FEBRUARY 13.

Breakfast.—Corn-meal mush with top of milk, hashed meat on toast, milk and cereal coffee.

Dinner.—Salt salmon, drawn butter sauce, baked potatoes, parsnips, bread, evaporated apple shortcake.

Supper.—Cold sliced beef's heart, creamed potatoes, cocoa, bread (white and graham), ginger snaps.

"The family in this experiment consisted of 30 students—26 women and 4 men—ranging in age from 25 to 45 years. Considering the 4 men as equivalent to 5 women as regards food consumption, the family for six days was equivalent to 186 women for one day.

The
Family

"The cost of the diet, 9.4 cents per woman per day, was just within the limit set, but the quantities of nutrients and energy (75 grams of protein and 2,243 calories) were somewhat smaller than was intended.

Cost of
Food

"The low cost of the diet in this experiment was made possible by the selection of simple and inexpensive food materials and by reducing the quantities of some foods commonly used rather abundantly, as meat and butter. Most of the students felt quite satisfied with the food. The curtailing of the amount of butter served at the table was considered the greatest deprivation; a small pat, about half the customary size, being served to each where butter is indicated with bread on the menu.

**Economy
and
Nourishment**

"The importance from the standpoint of economy of selecting foods which are nourishing rather than those having a low food value but which please the palate and add to the attractiveness of the diet, is illustrated by a dietary study made of a family in New Jersey in which it was found that \$2.16 was expended in three weeks for oranges and \$3 for celery, making a total of \$5.16 for these two articles, which together furnished only 150 grams of protein and 6,445 calories of energy. During the same period \$5.16 was also expended for cereal foods and sugars, which supplied 3,375 grams of protein and 184,185 calories of energy, or about twenty-five times the amount furnished by the oranges and celery. Of course, the sum expended for these articles was not excessive and they undoubtedly helped to make the diet palatable and pleasing, a by no means unimportant consideration, but it is evident that they were not economical sources of nutritive material.

**Dainty
Serving**

"In the present investigation it was found to be well worth while to use special care in arranging the dishes for serving, that they might be as appetizing in appearance as possible. Much care was also observed in avoiding waste both by careful preparation and by the use of all 'left overs.'"

In the following table is given the details of cost, weight and nutritive value of the food used in this investigation.

COST OF FOOD

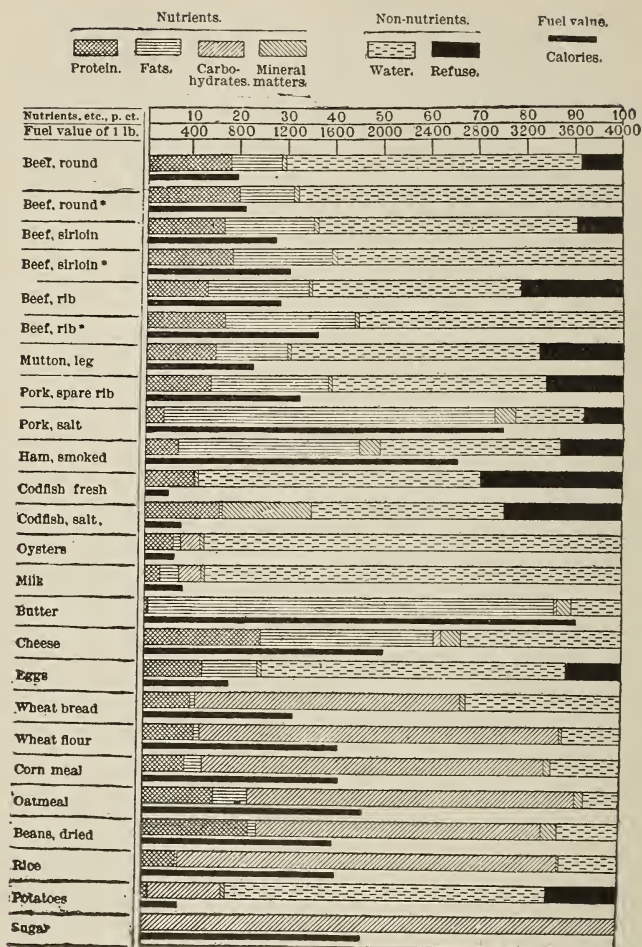
27

Weights and Cost of Food and Nutrients

Food consumed during the entire study (6 days).		Cost, nutrients, and fuel value per woman per day.				
Kinds and amounts.	Cost.	Cost.	Pro- tein.	Fat.	Car- bohy- drates.	Fuel value.
	<i>Dols.</i>	<i>Cts.</i>	<i>Gms.</i>	<i>Gms.</i>	<i>Gms.</i>	<i>Cal- ories.</i>
ANIMAL FOOD.						
Beef: Hearts, 11 lb., 38c.; round, 10.5 lb., \$1.05; rump, 10 lb., 80c.; shank, fore, 3 lb.; brisket (stew), 7.25 lb., 50c.....	2.73	1.5	15	19	.....	229
Pork: Bacon, 2 lb., 30c.; salt pork, 2 lb., 18c.; lard, 1 lb., 12c..	.60	.3	1	8	.....	75
Fish: Cod, salt, 4 lb., 42c.; salmon, salt, 5 lb., 40c.....	.82	.4	5	2	.....	38
Eggs, 1 lb., 33c.....	.33	.2	.....	.....	.....	.....
Butter, 9 lb., \$2.25.....	2.25	1.2	.....	19	.....	169
Cheese, 2 lb., 30c.....	.30	.2	1	2	.....	22
Milk, 210 lb., \$2.70.....	2.70	1.4	17	20	26	350
Total animal food.....	9.73	5.2	39	70	26	883
VEGETABLE FOOD.						
Cereals: Corn meal, 10 lb., 29c.; pop corn, 1 lb., 5c.; hominy, 1.44 lb., 5c.; oatmeal, 4.5 lb., 15c.; rice, 4 lb., 28c.; graham flour, 10 lb., 25c.; white flour, 66 lb., \$1.55; crackers, Boston, 0.75 lb., 4c.....	2.66	1.4	27	4	178	856
Sugars, starches, etc.: Sugar, granulated, 20 lb., \$1; molasses, 2.33 lb., 36c.; cornstarch, 0.33 lb., 2c.; cocoa, 1 lb., 17c.; chocolate, 0.12 lb., 5c.....	1.69	.9	1	1	54	229
Vegetables: Beans, lima, 2 lb., 18c.; beans, pea, 2.44 lb., 10c.; beets, 1.25 lb., 4c.; cabbage, 5 lb., 10c.; carrots, 1.25 lb., 2c.; celery, 2.06 lb., 10c.; parsnips, 4.69 lb., 15c.; peas, split, 1.69 lb., 13c.; potatoes, 80 lb., \$1.47; turnips, 5.5 lb., 7c.....	2.36	1.3	7	1	41	201
Fruits, nuts, etc.: Apricots, 1.5 lb., 17c.; bananas, 7 lb., 30c.; dates, 2 lb., 12c.; prunes, 2 lb., 18c.; raisins, 0.25 lb., 2c.; pea-nuts, 2 lb., 25c.; crab-apple jelly, 0.2 lb., 3c.....	1.07	.6	1	2	13	74
Total vegetable food.....	7.69	4.2	36	8	286	1,360
Total food.....	17.42	9.4	75	78	312	2,243

FOOD AND DIETETICS

Chart of Composition of Foods

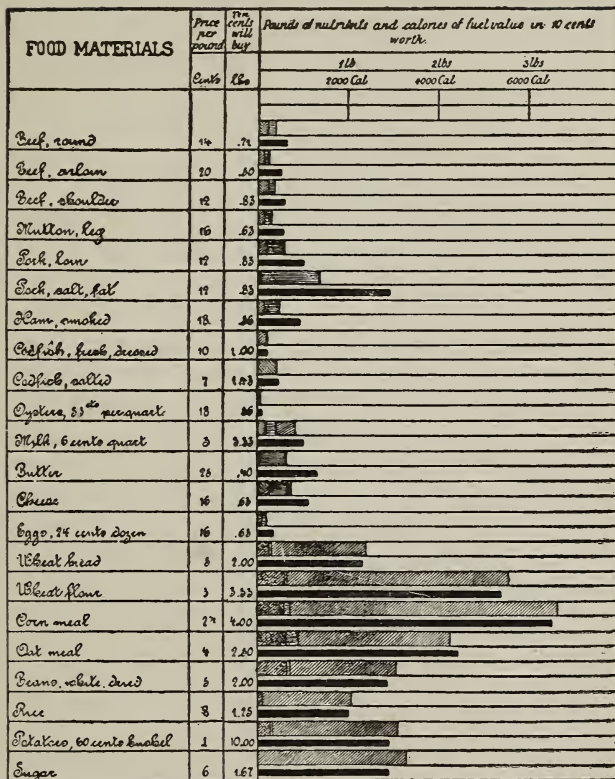


COST OF FOOD

29

Chart of Pecuniary Economy of Food

Protein. Fats Carbohydrates Fuel Value.



From Farmers' Bulletin, No. 142.

FOOD AND THE BODY

Composition

It is impossible to decide intelligently how the money available for food shall be distributed among different food materials without understanding something of the composition of these food materials, and of the relation of food to the needs of the body. Experience has taught us many things, but the accumulation of experience needs interpretation by definite scientific knowledge. Until lately this knowledge was in the hands of only a few, and even then in so indefinite a form that it was not available for the housekeeper, no matter how well trained, and hardly for an educated physician.

Much progress has been made, but even to-day the housekeeper is often a little slow in availing herself of the knowledge she needs. This is partly because of the common feeling that what our fathers and mothers knew is enough for us, and partly because so much of the information is still locked up in more or less technical books; and the ordinary housekeeper, even though she be well educated, has not the key. It is to furnish the key to some of this knowledge that this series of lessons is written.

Function of Food

We all know in a general way that food nourishes us and makes us strong. But when we try to interpret this general idea into specific terms we find that we do not realize its meaning. Nothing is in the strict sense a food unless it performs at least one of three

functions, (1) that of building the body, (2) furnishing heat, and (3) giving power to work.

The first function of food, that of building the body, is exercised not only in the growing child, where the material that can be transformed into bones and muscles, blood and nerve tissue, must be furnished by food, but in the adult, since even after growth has ceased, the constant waste of the body tissue must be repaired by food. So far as this function is concerned, the composition of the body must determine to a great extent the kind of material that may be used as food. It is easy to see that the body can be built only by foods containing the same elements, and that the proportion of these elements must bear some relation to their proportion in the body. It is reasonable to expect that the elements are combined in food in a way similar to that in which they are combined in the body

**Building
Foods**

The body of a man of average weight has been estimated to contain the following amounts of the various combinations known as the proximate principles:

**Composition
of the Body**

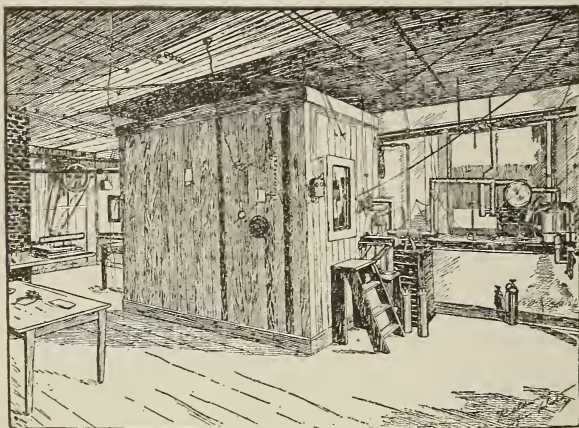
Water	108	lbs.
Mineral matter.....	11.00	
Proteid.....	29.75	
Fat.....	5.00	
Carbohydrates.....	.25	

Total 154.00

It will be judged from this that so far as the organic food principles proteid, carbohydrate and fat are concerned, proteid holds the chief place as a tissue former.

Fuel and
Energy
Foods

Not only must the body have its actual material furnished by the food, but from this also must be derived its energy.



ATWATER'S RESPIRATION CALORIMETER.

A Man Lives in the "Box" for Days and the Actual Heat and Energy Obtained from the Food Consumed is Determined. (See page 52.)

The two forms of energy with which we are especially concerned in our study of the body are heat and power to work.

Heat

Heat is required to maintain the body temperature necessary in order that the processes of life may be carried on.

Work

The work performed may be considered as of two kinds, internal and external. The internal work is that used in maintaining the different functions of

the body itself. The beating of the heart, breathing, the absorption of food, all require the expenditure of energy; this internal work requires a large portion of the available power. As in all machines, energy is lost in the form of radiant heat, but the body is considered an efficient machine because a larger proportion of energy is available for external work than in most engines constructed by man.

The amount of energy required for external work is a variable factor, and the work to be done is consequently important in determining the amount of food necessary.

External
Work
Variable

So far as present knowledge goes, we may say that the energy of the body is derived from the oxidation (or combustion) of food that takes place in the tissues of the body. The process is undoubtedly a complex one, far from the simple union of the food with the air we breathe, and probably implies the actual building of the food into body substance, but we are concerned chiefly with the final result rather than the process by which it is reached.

Source of
Energy

All combustible substances have what is known as potential energy. This might be defined as stored-up energy. It implies that energy from some exterior source has been used in producing the substance in its present form. For instance, heat from the sun has been utilized in the formation of the starch or proteid in the plant, and this energy is again set free in the oxidation or the decomposition of the substance.

Potential
Energy

Potential energy may perhaps be most easily understood by thinking of one form of it, energy of position. A weight lifted to a height has by virtue of its place a certain amount of *potential energy*. The fall of the weight from its position will convert its potential energy into active or *kinetic energy* by which work is accomplished.

The waste materials of the body have little or no potential energy, and the outgo of the body differs in this important respect from its income. If the food taken in is only partially oxidized, the waste material still contains some energy, and this potential energy must be subtracted from that of the income in order to find the amount available for the use of the body.

Unit of
Heat and
Energy

The value of a food to produce heat and mechanical energy is measured by the amount of heat that may be produced by it, and the unit of measure is the calorie. A calorie is the amount of heat required to raise about one pound of water four degrees Fahrenheit, or, accurately, the amount of heat required to raise one kilogram of water one degree centigrade. This is the large calorie, and it is sometimes written with a capital *C* to distinguish it from the small calorie. The small calorie has a value one-thousandth as great. The term used in this paper means the large calorie.

It has been found that there is an exact quantitative relation between heat and work, expressed by the term *mechanical equivalent of heat*. Experiments have shown that about 778 foot-pounds of work are con-

sumed in heating one pound of water one degree Fahrenheit, or 1400 foot-pounds in heating the same amount of water one degree Centigrade. In other words, the same amount of energy would be expended in heating a pound (about one pint) of water one degree Fahrenheit, as in raising a weight of 778 pounds one foot, or a weight of one pound 778 feet. By the same calculations a calorie is equivalent to 3,087 foot-pounds. The calorie then is used as a convenient measure *not only of quantity of heat, but of mechanical energy, or power to work.*

One gram of proteid has been found to yield 4.1 calories; a gram of carbohydrate yields the same amount, while a gram of fat yields 9.3 calories. Or more than twice as much heat can be obtained from a given amount of fat as from the same amount of either proteid or carbohydrate.

The number of calories any particular food will yield theoretically is determined by the use of the bomb calorimeter. A portion of food of a given weight is enclosed in an iron shell or "bomb," which is then immersed in a given amount of water and the temperature of the water taken. By means of an electric spark the contents of the bomb are ignited and burned, and the temperature of the water is again taken at the end of the combustion. For instance,

**Mechanical
Equivalent
of Heat**

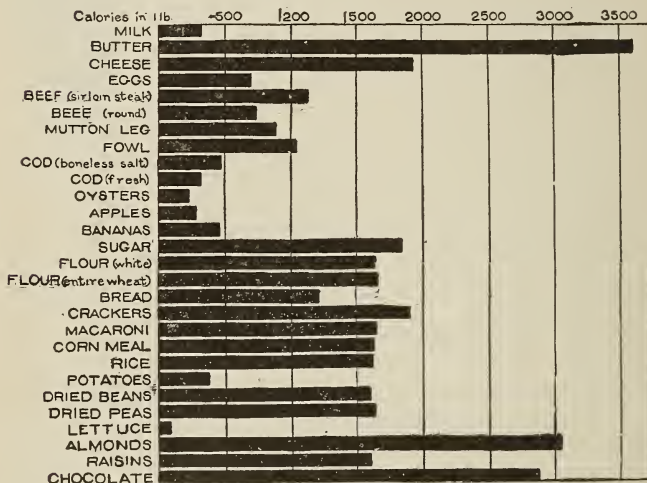


The "Bomb" of
a Bomb Cal-
orimeter.

**Bomb
Calorimeter**

if the burning of one gram of meat raised the temperature of one kilogram (about two pounds) of water seven degrees Centigrade, that amount of meat would be said to yield seven calories.

CHART OF HEAT AND ENERGY
Values in Calories of some Common Foods



The chart given shows the number of calories yielded by several different foods.

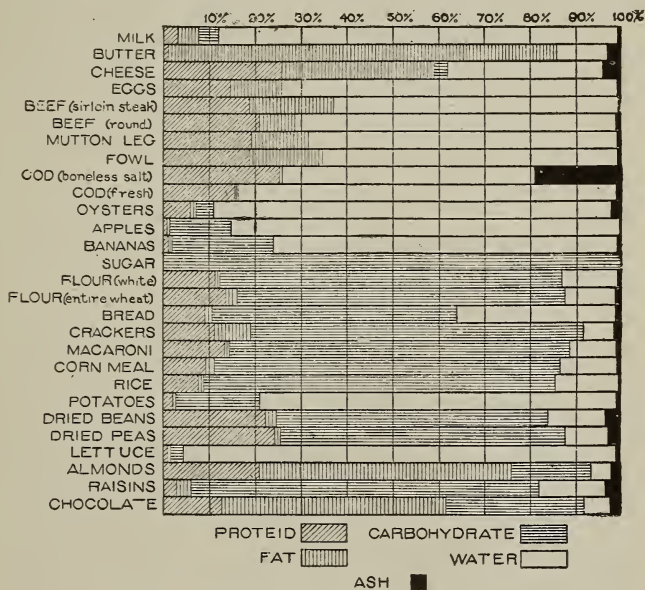
Digestibility

There is one factor that is often not sufficiently considered in determining the amount of energy ob-

tainable from food. A food may yield excellent results in the calorimeter and yet be of little service in the body because of its lack of digestibility. It is

CHART OF COMPOSITION OF FOODS

Percentage of Nutrients of Edible Portion, i. e., Without Bone, etc.



by no means the food we eat but the food we *assimilate* that nourishes us. The portion of food that is really absorbed by the body differs greatly under different conditions and with different food materials. Many

careful experiments have been made of late, and more will be made to determine the amount assimilated in different cases. This element of digestibility is frequently not taken into account, and the value of a food is estimated wholly from its chemical composition.

Some reasons for this are the great difficulty in determining the digestibility of a food, the fact that this digestibility may vary from time to time according to the condition of the body, and the fact that the personal equation enters largely into the matter.

The accompanying tables showing the comparative digestibility of some common foods are therefore merely a general statement, and represent average results.

Table of Digestibility and Fuel Value per Pound of Nutrients in Different Groups of Food Materials. (Atwater.)

Kind of food.	Protein.		Fat.		Carbohydrates	
	Digestibility.	Fuel value per pound.	Digestibility.	Fuel value per pound.	Digestibility.	Fuel value per pound.
	Per cent.	Calories.	Per cent.	Calories.	Per cent.	Calories.
Meats and fish.....	97	1,940	95	4,040	98	1,730
Eggs.....	97	1,980	95	4,090	98	1,730
Dairy products.....	97	1,940	95	3,990	98	1,730
Animal food (of mixed diet) ..	97	1,940	95	4,050	98	1,730
Cereals.....	85	1,750	90	3,800	98	1,860
Legumes (dried).....	78	1,570	90	3,800	97	1,840
Sugars.....					98	1,750
Starches.....					98	1,860
Vegetables.....	83	1,410	90	3,800	95	1,800
Fruits.....	85	1,520	90	3,800	90	1,630
Vegetable foods (of mixed diet) ..	84	1,840	90	3,800	97	1,820
Total food (of mixed diet)....	92	1,820	95	4,050	97	1,820

Table of Comparative Digestibility, Commencing with the Most Digestible and Ending with the Least Digestible of Meats and Other Common Animal Food.

Oysters.	Tripe, brains, liver.
Soft-cooked eggs.	Roast lamb.
Sweetbread.	Chops, mutton or lamb
White fish, boiled or broiled, such as bluefish, shad, red snapper, weakfish, smelt.	Corned beef.
Chicken, boiled or broiled.	Veal.
Lean roast beef or beefsteak.	Ham.
Eggs, scrambled, omelette.	Duck, snipe, venison, rabbit, and other game.
Mutton, roasted or boiled.	Salmon, mackerel, herring.
Squab, partridge.	Roast goose.
Bacon.	Lobsters and crabs.
Roast fowl, chicken, capon, turkey.	Pork.
	Smoked, dried, or pickled fish and meats in general.

(From W. Gilman Thompson.)

It should be noticed that the fuel value obtained in the body from the various classes of foods is somewhat less than the theoretical amount mentioned on page 35, because they are not completely digested and assimilated nor completely oxidized in the body. The following values are used in the U. S. Government reports as representing average conditions:

Proteid, fuel value, 4 calories per gram, or 1,820 calories per pound.
 Fats, fuel value, 8.9 calories per gram, or 4,040 calories per pound.
 Carbohydrates, fuel value, 4 calories per gram, or 1,820 calories per pound.

The foods that are particularly useful in furnishing heat and energy for the body, the carbohydrates and fats, are frequently called the fuel foods, although proteid can act as fuel just as readily as can these. Since the proteids, however, have a more important function and are most expensive, the other foods are used as *proteid spacers*. The amount of these fuel foods that is to be taken depends not upon the amounts

Fuel Value
in the Body

Fuel and
Energy
Foods

present in the body, but upon the amount of heat and energy to be produced.

The Body
and
An Engine

The comparison is frequently made between the body and an engine, the food representing the fuel, the air taken in through the lungs representing the draft, the waste matters of the body corresponding to the smoke and ashes from the engine fire. In many ways this is a helpful comparison, but we need to keep in mind the essential differences between the human body and the mechanical engine as well as their likeness. Combustion in the body is much slower than in the machine, and is therefore not accompanied by light, though by the oxidation of the same amount of fuel the same total amount of heat is produced. Oxidation in the body takes place not in one central cavity, but in every tissue, and, most important of all, the fuel furnished the body probably becomes part of its own substance before it is oxidized. Moreover if it is not sufficient in amount the waste of tissue proceeds faster than its repair, and there is a constant loss of body substance.

FOOD PRINCIPLES

In this and other series of lessons we have already discussed the food principles to some extent. Let us consider them now somewhat more in detail.

PROTEIDS

The proteids are more difficult to understand than the other food principles because different members of the class seem at first sight to have little in common. A few simple experiments that will isolate some typical proteids in a more or less pure state will serve to give a clearer image.

Different
Proteids

To a quarter of a cup of flour add very slowly a tablespoon of water and stir it until the flour is completely moistened, then work the dough in the hands until it becomes smooth and elastic, and finally wash it under cold water until fresh water added no longer grows milky. This will take from fifteen to twenty minutes. If a little iodine is at hand add a drop. If no blue color appears the starch is all washed out. There will be left in the hands a sticky, elastic mass, called gluten. Save part of this for comparison with other proteids and bake the rest in a hot oven.

Gluten

Add a little acid, such as lemon or vinegar, to some milk, and heat it gently. Wash the curd thus formed in order to separate it from the whey. The curd is chiefly composed of casein.

Casein

With a knife scrape a piece of lean meat until the tender muscle fibre is separated from the firm white

Myosin

connective tissue. The fibre represents one of the chief proteids of meat, called myosin. Beside the gluten, the casein, and the myosin, put the white of an egg, and you have before you the four chief representatives of the proteids of our food.

Legumin

If we could add to them legumin, the proteid found in peas, beans, and other members of the pulse family, we should have a fifth important member of the class.

If we compare these substances, we shall find that although at first they seem very different, they yet have certain properties in common. All, for instance, to a greater or less extent, show the elasticity and tenacity that is so marked in gluten; all of them are toughened by a high temperature; and all when dried may be ground to powder similar in texture and appearance.

**Composition
of Proteids**

These physical likenesses, however, would hardly be sufficient to place these substances in one group. It is only when we consider the chemical composition of each and the function that each has in the body that we are justified in classing them together as proteids. Proteids are substances containing the elements carbon, hydrogen, oxygen, nitrogen, sulphur and frequently phosphorus. They alone of the food principles are able to supply nitrogen, one of the essential elements in all living things, whether animal or vegetable, and one that we are forced to obtain from our food, since, although we are surrounded by an atmos-

phere that is nearly four-fifths nitrogen, we cannot utilize it in this form.

Beside the true proteids, there are certain other substances which also contain nitrogen, but which are classed separately because they cannot alone supply the nitrogen needed by the body, though they can replace part of the proteid in the diet, and perform its function. Gelatine is one of the best known of these substances. They are called gelatinoids or albuminoids. Ossein, of which bone is largely composed, keratin, the horny material present in the hair and in the horns and hoofs of animals, collagen, forming the greater part of the connective tissue of meat, are all representatives of the same class of substances. All these named may be changed into gelatin by boiling.

Gelatin

Certain other nitrogenous substances called extractives, are present in some foods. It is these that give flavor to meat, and that form the chief ingredients of the extracts of beef on the market; and it is these that give the chief value to beef tea and to clear soup. The extractives act as stimulants rather than as true foods since they neither build tissue nor act as fuel, but they seem to play some role in digestion.

Extractives

The proteids, gelatinoids, and extractives, are sometimes classed together under the general name of protein. This is the usage of the United States Government pamphlets. The nomenclature applied to the nitrogenous substances is very confusing, since each author seems to have adopted his own. Albumi-

Nomenclature

noid, for instance, is sometimes used to designate the true proteids, and sometimes is applied to the gelatinoids. Proteid is sometimes used in a much more limited sense than we have given to it, including only certain classes of the substances ordinarily designated by the term.

In studying the subject, therefore, one must first of all ascertain the writer's use of terms.

CARBOHYDRATES

Composition



Grains of Potato Starch.

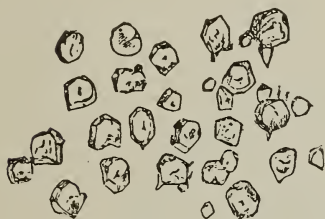
The carbohydrates are so called because they are composed of the elements carbon, hydrogen and oxygen, the last two in the proportion in which they are found in water. This last statement, although it is generally made in defining carbohydrates, is not strictly true, since a few of the less common members of the class are found to vary somewhat from this proportion.

The principal carbohydrates may be classed in three groups. The following table shows the chief members of these different groups, so far as our food is concerned.

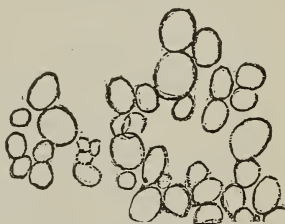
Classification of Carbohydrates

Starch (or Amylose) Group.	Cane Sugar (or Sucrose) Group.	Grape Sugar (or Glucose) Group.
$C_6 H_{10} O_5^n$ Starch Dextrin Cellulose Gums Glycogen	$C_{12} H_{22} O_{11}$ Cane Sugar (Sucrose) Malt Sugar (Maltose) Milk Sugar (Lactose)	$C_6 H_{12} O_6$ Grape Sugar (Dextrose) Fruit Sugar (Levulose)

That the second and third groups bear a definite



Corn Starch.



Rice Starch.

(From *Hygiene*, by Parks.)

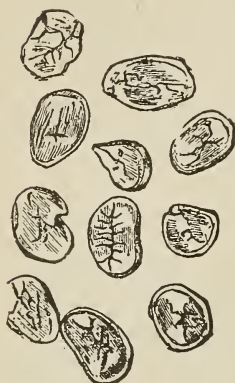
chemical relation to the first may be seen by a comparison of their formulae.

Starch is the most important of the carbohydrates from the standpoint of food. It is familiar to us all as the fine, white, glistening powder of "corn starch" and of laundry starch. We may easily, by washing it, obtain it also from grated potatoes and from flour. Starch is found only in the vegetable kingdom, and is manufactured by green plants and stored in different parts of the plant in the form of tiny grains lying within the plant cells.

Starch

Structure
of Starch

The structure of these grains has been very hard to determine because of their minuteness. It was thought for a long time that they were composed of a cellulose envelope enclosing the true starch, and that by the action of water and heat these grains swelled and the cellulose envelope burst.



Bean Starch.

A later theory was that the starch grain was built up in alternate layers of starch cellulose and starch granulose.

The late work of a German botanist, Meyer, seems to show that the grains are in the form of spherocrystals, each made up of many tiny particles. These

radiate from a center, and at the same time are arranged in concentric layers. The particles are of two kinds called by Meyer alpha-amylase and beta-amylase. These may be compared to the starch cellulose and starch granulose of the older theory. Upon the application of heat and moisture the beta-amylase swells and becomes gelatinous, forming a solution. The alpha-amylase is affected only by a temperature much above the boiling point, or by long continued heating.

Starch Grains

The starch grains in different plants differ much in form, size and general appearance, as shown in the

illustrations. The relation of the difference in structure to digestibility is not well determined.

Dextrin is a substance having the same general composition as starch, but unlike it in some of its properties. It is chiefly important to us in that it is an intermediate product of the change of starch into sugar.

Dextrin

Glycogen is the form in which carbohydrate is stored in the body until it is needed for use. It is

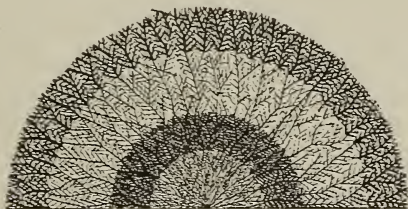


Diagram Representing the Supposed Structure of a Sphero-Crystal of Starch, Showing Radial and Concentric Arrangement.

From A. Meyer.

found chiefly in the liver and is sometimes called animal starch.

Cellulose is so slightly digested that we do not put it in the list of human foods, yet it is important from two standpoints. First, it gives the necessary bulk to food; and second, it so encloses the nutrients in vegetables and fruits that it must be definitely considered in cookery.

Cellulose

Allied to the gums are the pectose and pectin that are concerned in the making of jelly from fruit juice. The gelatinous substance obtained from Irish moss also belongs in this class. The sugars will be discussed under the special foods.

FATS

Composition

The fats, like the carbohydrates, are composed of carbon, hydrogen and oxygen, but with these elements in very different proportions from that in which they exist in the carbohydrates. There is a much larger proportion of carbon with less oxygen than in starch and sugar, and this accounts for the readiness with which they burn and the intense heat that we get from them. They are of both animal and vegetable origin. Those which are liquid at ordinary temperature we often speak of as oils.

Water and Mineral Matter

In discussing the value of a food we commonly consider only the organic principles. Although water is absolutely necessary it is so easily supplied and so abundant that we do not have to consider whether or not it is present in our food as we purchase it. This is not true of mineral matter to so great an extent, but it is largely so, except in the case of growing children. The mineral matter will, as a rule, take care of itself if we provide the other substances needed.

Nutrient Ratio

By food value or nutritive value we ordinarily mean the amount of organic nutrients present in the food. In determining the importance of any particular food, we consider not only the total amount of the nutrients

present, but the relation that the proteid bears to the other nutrients. This is often called the *nutrient ratio*. The nutrient ratio of potatoes, for example, containing two per cent of proteid and eighteen of starch, is 1 to 9. In reckoning this ratio, fat is changed into its starch equivalent, that is, one part of fat is considered equal to two and a quarter of starch.

The following classification of the food principles may help to fix in the mind their relationship.

Classification
of Foods

Nutritive Ingredients (or Nutrients) of Food

Organic..	{	Nitrogenous.....	{	Proteids, e.g., albumin, casein, gluten, etc.
				Gelatinoids, e.g., gelatine, etc.
				Extractives.
		Non-nitrogenous	{	Carbohydrates, e.g., sugar, starch.
				Fats.
Inorganic..	{	Mineral matters.	{	
		Water		

Use of Food Principles in the Body

Proteid.....	Forms tissue.....	{	All serve as fuel to yield energy in the forms of heat and muscular power
e.g., white (albumen) of eggs, curd (casein) of milk, lean meat, gluten of wheat, etc.			
Fats.....	Are used or stored as fat.....		
e.g., fat of meat, butter, olive oil, oils of corn and wheat, etc.			
Carbohydrates.....	Are used or transformed into fat.....		
e.g., sugar, starch, etc.			
Mineral matters (ash) ..	Share in forming bone, assist in digestion, etc.		
e.g., phosphates of lime, potash, soda, etc.			

DIETARY STANDARDS

Amount
of Food
Required

In addition to a knowledge of food constituents, of the proportion of which these exist in our food, and of the use of food in the body, we need to know the amount of food necessary to supply our daily needs under different conditions. Many factors will influence not only the total amount of food that we need, but also the proportions in which we shall use the proteids, the carbohydrates and the fats. The flesh weight of the body is important in deciding the amount of proteid (that is, the muscle weight, not the total weight of the body) since the greater the flesh weight the greater the nitrogenous waste. The shape of the person, whether tall or thin, or short and plump, influences the amount of fuel food required, since the amount of surface exposed affects the loss of heat. The degree of activity has an important influence upon the amount of all the food principles. Variations in climate to a certain extent affect the amount of heat to be produced in the body, and occupation also has an important influence.

Food for
Different
Ages

The age of the individual is, within certain limits, one of the greatest factors. The growing child needs a large amount of building material, while the old person needs distinctly to lessen the tissue building foods. The accompanying diagram gives an idea of the way in which these proportions vary with different ages. It will be seen that the proportion of proteid is much greater in comparison with other food materials

in the case of the child than of the adult. The total amount of food is also greater in proportion to body weight in the child than in the adult. Although not shown in the table, mineral salts are needed in large proportion in the child's diet, while they may well be cut down in the diet of the old. The amount of food needed increases rapidly from birth to about four

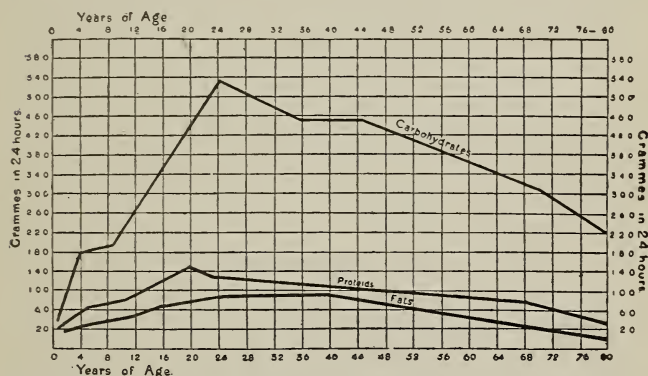


Diagram Showing the Varying Amounts of Food Principles Required at Different Ages.

years of age, very slowly from four to about ten, with a rapid increase from this time to twenty-four. From ten to twenty-four the carbohydrates should increase in amount more rapidly than the other food principles.

To put in terms of the nutrient ratio the difference between the diet of the child and that of the adult—in the adult diet the ratio is about 1:5.3; in the diet of the child, 1:4.3.

Nutrient
Ratio

**Standard
Dietaries**

These statements are of course true only approximately, yet one familiar with children must recognize in them a fair generalization from the facts.

The proportions of the different food principles needed daily constitute the dietary, and dietary standards have been made up taking into account as far as possible these different conditions. These dietaries are sometimes called experimental, and sometimes statistical, according to the method used in formulating them. An experimental dietary is the result of careful observations of the effect of different proportions of food nutrients upon an individual under determined conditions. The statistical dietary is the outcome of the study of the actual ration of large numbers of people. Each of these has its drawbacks. In the first case it is difficult to decide how far the result is due to individual idiosyncrasy, and a large number of experiments must be tried before the personal factor can be eliminated. In the second case it is hard to determine whether some variation in the diet might not produce better results.

**Experimental
Dietaries**

An example of the first method of formulating dietaries is that of Professor Atwater's respiration calorimeter, sometimes called "the man in a box," described in one of the government pamphlets. A small room was constructed in the laboratory with flues arranged to bring in fresh air and to carry off the products of respiration. Each of these flues was arranged so that the temperature and composition of the air entering

and going out might be determined. A man lived in this room for several days at a time, his food being given to him by means of slides in a double wall. A sample of each food given was analyzed and a determination of the number of calories yielded by it made by means of the bomb calorimeter. All food taken was carefully weighed, and the excreta of the body were analyzed so that an accurate estimate could be made of the total income and outgo of the body. See illustration on page 32.

Many statistical dietaries have been taken, some of the most valuable being those of the German army. Experiments have been made there as to the effect of the addition of certain articles of food to the diet, and the conclusions have been of much value. Similar dietary studies have been made at many schools and universities.

Statistical
Dietaries

From a careful comparison of dietaries made up in these two ways certain standards have been determined upon. The American standards vary in some important points, notably in the amount of fat used, from those of Europe. Some of these dietaries are given here.

Standard Dietaries

	Proteid Grams	Fat Grams	Carbohydrat's Grams	Total Grams	Calories
<i>Voit</i>					
Woman at moderate work (German).....	92	44	400	536	2425
Man at moderate work (German).....	118	56	500	674	3055
Man at hard work (German).....	145	100	450	695	3370
<i>Playfair.</i>					
Man with moderate exercise (English).....	119	51	531	701	3140
Active laborer (English).....	156	71	568	795	3630
Hard-worked laborer (English).....	185	71	568	824	3750
<i>Atwater.</i>					
Woman with light exercise (American).....	80	80	300	460	2300
Man with light exercise (American).....	100	100	360	560	2815
Man at moderate work (American).....	125	125	450	700	3520
Man at hard work (American).....	150	150	500	800	4060

There are twenty-eight and thirty-four hundredths grams (28.34) in one ounce. A man at moderate work requires, therefore, according to the American standard, about four and one-half ounces of proteid, four and one-half ounces of fat, and nearly a pound of carbohydrate daily.

Chittenden's
Experiments

The dietary standards that we have been considering are those that have been accepted generally since work of this kind was first begun. Some late experiments conducted at Yale University by Professor Chittenden and others, indicate that a much smaller amount of food, especially of proteid, may better serve the purposes of the body, than the larger amounts indicated in these standards. The experiments were carried out upon men representing three different classes of individuals. The first class was composed chiefly of

professors and instructors. The second represented the moderate worker. The third class were trained athletes. The experiments covered a period of five months, and the proteid taken daily varied from about thirty-five to fifty grams per day, while the total number of calories yielded was from twenty-five to twenty-eight hundred a day. The general conclusion drawn from these experiments is that under ordinary conditions of life, with an ordinary amount of work, bodily health and vigor are maintained as well, if not better, on a minimum proteid diet than on the amount given in the generally accepted standards.

Some careful experiments and analyses recently made by the physiological chemist, Dr. Otto Folin, at the McLean Hospital, Waverly, Mass., indicate that about twenty grams of proteid represents the actual daily proteid wastes of an average sized man under ordinary conditions. That is, only about three-fourths of an ounce of proteid material is necessary per day in an adult to rebuild the nitrogenous tissue of the body that wears away through use.*

Such radical differences from standards found by long experience to give good results in health and strength must be considered very carefully before being accepted. But in this as in many other ways, we may be obliged to revolutionize our ideas of food.

We must not fail to distinguish between the amount of proteid required and the amount of food containing proteid. If, for example, meat be supplied containing

Dr. Folin's
Experiments

Amount
of Food
to Furnish
Required
Proteid

*See Report of the Lake Placid Conference on Home Economics, 1905, and American Journal of Physiology, March, 1905.

18 per cent of proteid (a fair average), a little more than a pound and a half of the meat will be required to furnish the four and a half ounces of proteid. Bread containing 9 per cent of proteid would be required to the amount of three pounds. Nearly two pounds and a quarter of eggs, with 13.1 per cent of proteid, or about eighteen eggs, would be necessary to supply four and a half ounces of pure proteid.

**Example for
Practice**

Taking the percentage composition from the accompanying table, calculate the amount of milk that would be required daily to furnish four and a half ounces proteid. How much potato would be required? How much corn meal?

Calculations

Calculations: From the table, milk is found to contain 3.3% of proteid or 1 oz. contains .033 oz. protein. To furnish 4.5 ozs. would require

$$4.5 \div .033 = 136+$$

As a pound contains 16 ozs., 136 oz. = $8\frac{1}{2}$ lbs. A pint of milk weighs about 1 lb., so about $4\frac{1}{4}$ quarts would be required to provide 4.5 ozs. of proteid.

Potatoes *as purchased* contain 1.8% proteid.

$$4.5 \div .018 = 250$$

$$250 \text{ oz.} = 15 \text{ lbs. (aprox.)}$$

A bushel of potatoes weighs about 60 lbs., consequently about one peck of potatoes would be required.

Corn meal contains 8.9% proteid and by the same calculations 3 lbs. 2 ozs. will be found to contain 4.5 ozs. of proteid.

**Balanced
Ration**

It is by no means a matter of indifference whether the proteid be derived from any one of these food

materials, or from a mixture of different ones. The other food ingredients present must be taken into account. For example, the three pounds of bread

Composition of the Edible Portion of Some Common Foods

	Ash, per cent.	Water, per cent.	Proteid, per cent.	Fat, per cent.	Carbohydrates, per cent.	Calories, per lb.
Milk.....	0.7	87.0	3.3	4.0	5.0	325
Butter.....	3.0	11.0	1.0	85.0		3,605
Cheese.....	3.8	34.0	25.9	33.7	2.4	1,950
Eggs.....	1.0	73.7	13.4	10.5		720
Beef (sirloin).....	1.0	61.3	19.0	19.1		1,155
Beef (round).....	1.1	65.5	20.3	13.6		950
Mutton (leg).....	1.0	63.2	18.7	17.5		1,085
Fowl.....	1.0	63.7	19.3	16.3		1,045
Cod (boneless salt).....	19.0	55.0	27.3	0.3		490
Cod (fresh).....	0.9	82.5	16.7	0.3		325
Oysters.....	1.1	88.3	6.0	1.3	3.3	230
Apples.....	0.3	84.6	0.4	0.5	13.0	290
Bananas.....	0.5	75.3	1.3	0.6	21.0	460
Sugar.....					100.0	1,857
Flour (white).....	0.5	12.0	11.4	1.0	75.1	1,650
Flour (entire wheat).....	1.0	11.4	13.8	1.9	71.9	1,675
Bread.....	1.1	35.3	9.2	1.3	53.1	1,215
Crackers.....	1.8	6.8	10.7	8.8	71.9	1,905
Macaroni.....	1.3	10.3	13.4	0.9	74.1	1,665
Corn meal.....	1.0	12.5	9.2	1.9	75.4	1,655
Rice.....	0.4	12.3	7.8	0.3	79.0	1,630
Potatoes.....	1.0	78.0	2.2	0.1	18.4	385
Dried Beans.....	3.5	12.6	22.5	1.8	59.6	1,605
Dried Peas.....	2.9	9.5	24.6	1.0	62.0	1,655
Lettuce.....	0.9	94.7	1.2	0.3	2.9	90
Almonds.....	2.0	4.8	21.0	54.9	17.3	3,030
Raisins.....	2.3	14.6	2.6	3.3	76.1	1,605
Chocolate.....	2.2	5.9	12.9	48.7	30.3	2,860

(See pages 36 and 37 for charts giving graphic representation of these foods.)

would furnish also more than a pound and a half of carbohydrates, a great excess of the required amount. The meat would vary in fat, but estimating

the per cent as twenty, the pound and a half would yield four and eight-tenths ounces, more than would be required for the day. The quantities used of these different foods must then be so adjusted that the nutrients will be in approximately the right proportion. The deciding upon these different quantities from the percentage composition of the food is the essential point in calculating dietaries.

**Practical
Use of
Dietaries**

The question will probably come to each one—of how much practical use for the everyday housekeeper is this study of dietaries. In the first place, it would mean the expenditure of a great deal of time if one should undertake to determine each day's rations in this way. In the next place, it is impossible to know the actual composition of the food that we eat, except in a few cases. We may be fairly sure of the composition of the egg, but when meat varies in proteid from 12 per cent to 22 per cent as it does according to the Atwater analyses, how are we to determine the composition of the particular cut that we are using to-day? Moreover, even if our meal were prepared so that the exact proportions of nutrients were furnished, it is quite possible that one member of the family might eat too large a proportion of the proteids and another too much of the carbohydrates.

Another element of uncertainty lies in the difference in composition between cooked and uncooked food. Rice, for example, according to the tables, contains 79 per cent of carbohydrate and 7.8 per cent of pro-

teid. But if you will weigh a cup of rice before it is cooked, and the same rice after it is cooked, you will find that it has gained perhaps four times its original weight. In other words, a quarter of a pound of cooked rice will only furnish about a fourth as much nutrient as a quarter of a pound of rice without the added water. Often we can allow for this difference in the calculation of our dietary; but sometimes we know too little about the changes which take place in cooking to do this. Finally, even if we know exactly what we eat we do not know what we assimilate. Is there, then, any use in the dietary standard?

In two ways it is of great service. In the first place, it is a standard by which we may test our diet if we extend our experiment over a sufficiently long period. At the beginning of a month let us take account of stock, estimate the amount of food materials on hand, and then keep careful account for a month of all food brought into the house; at the end of the month we will again estimate what we have on hand and in this way ascertain the amount of raw material used. Table IV, with the details which follow, gives an example of a carefully calculated dietary. The composition of the various foods was taken from Bulletin No. 28 of the office of Experiment Stations, U. S. Department of Agriculture.* If, on calculating the food value of the different materials, we find that for the

Variation
from
Standard

* "The Chemical Composition of American Food Materials" which may be obtained by sending five cents *in coin* to the U. S. Department of Agriculture, Office of Experiment Stations, Washington, D. C.

number of persons served we have a distinct variation from the standard diet, we can legitimately conclude that there is something wrong. If, for example, we find that the amount of proteid calculated in our food materials is twice as much as that supposed to be required, we shall conclude that either our families must be using a much larger amount of proteid than would be conducive to the best health, or there must be much unnecessary waste, and in either case, an investigation would be needed.

**Errors in
Dietaries**

Another way in which the dietary standard is of especial service, is in enabling us to judge what error in diet is responsible for some particular weakness or peculiarity in any member of the family. A girl of fourteen may be unusually thin or may appear languid and tired, and everything point to improper feeding as the cause. The first thing to do in this case would be to see whether the child's diet were deficient in any one of the three nutrients, and if so bring the diet up to the standard. In dealing with abnormal conditions, then, or with large masses of people, or with diet over an extended length of time, the dietary standards may be applied to great advantage. It is not necessary to apply it strictly to each individual at each meal.

The calculation of a few dietaries is very useful in giving us a definite idea of the general composition of foods, and so making it easier to estimate the amount of different nutrients which we are providing

at ordinary meals, without the tediousness of reckoning each meal in detail.

In such calculations the following factors are used to reduce the results to the standard of one man at moderate work.

Factors used by the U. S. Department of Agriculture in Calculating Meals Consumed in Dietary Studies.

Man at hard muscular work requires 1.2 the food of a man at moderately active muscular work.

Man with light muscular work and boy 15-16 years old require 0.9 the food of a man at moderately active muscular work.

Man at sedentary occupation, woman at moderately active work, boy 13-14, and girl 15-16 years old require 0.8 the food of a man at moderately active muscular work.

Woman at light work, boy 12, and girl 13-14 years old require 0.7 the food of a man at moderately active muscular work.

Boy 10-11 and girl 10-12 years old require 0.6 the food of a man at moderately active muscular work.

Child 6-9 years old requires 0.5 the food of a man at moderately active muscular work.

Child 2-5 years old requires 0.4 the food of a man at moderately active muscular work.

Child under 2 years old requires 0.3 the food of a man at moderately active muscular work.

Factors

In making dietary studies all food used should be weighed, but the following data may be of use for approximate home calculation:

**Home
Studies**

1 measuring cup = $1\frac{1}{2}$ pint.

16 tablespoons = 1 cup.

3 teaspoons = 1 tablespoon.

A cup of water weighs about 8.3 oz., of milk 8.6 oz., of cream 8.4 oz., of butter 8.4 oz., of lard 7.5 oz., of sugar 8 oz., and a tablespoonful of the foregoing weighs about 0.5 oz. A cup of meal weighs 5 oz., of sifted flour 4 oz., of oatmeal 2.7 oz., of cream of wheat 6 oz. A cubic inch of meat or butter weighs about 0.5 oz. An egg without shell weighs 1.6 oz. A slice of bread $1\frac{1}{2}$ in. thick weighs 1 oz., a heaping teaspoonful of sugar 0.4 oz.

TEST QUESTIONS

FOOD AND DIETETICS

PART I

1. What to-day is included in the food problem?
2. What factors affect the proportion of the income spent for food?
3. At current prices in your locality, give a list of foods you would provide for a day's ration at 15 cents per person for raw food material. At 25 cents. At 40 cents.
4. To what extent can waste in food be eliminated?
5. How do animal and vegetable foods compare in cost?
6. Which would be the cheaper source of proteid, beefsteak at 22 cents per pound, milk at 7 cents per quart, bread at 5 cents per pound, corn meal at 3 cents per pound? Give details of calculations.
7. With what two forms of energy are we chiefly concerned? What is meant by potential energy?
8. What is meant by calorie? By the mechanical equivalent of heat?
9. How does the amount of heat produced by proteid compare with that obtainable from an equal amount of starch? With that from an equal amount of fat?

FOOD AND DIETETICS

10. What relation has digestibility to food value?
11. What are the five food principles? Give their functions. Which of the food principles is most important?
12. What is meant by proteid? Name the most common representatives of the class found in food.
13. If possible, perform the experiments in separating some of the proteids as described and report.
14. How does gelatine differ from the true proteids? How may it be obtained?
15. What is the most important carbohydrate from the standpoint of food? What is its source?
16. How do fats differ from carbohydrates?
17. What is meant by food value? By nutrient ratio?
18. How are dietary standards determined?
19. What factors affect the amount and proportion of food needed?
20. Of what practical value to the housekeeper are dietary standards?
21. Calculate the amount of proteid, carbohydrate, and fat in your own diet for one day as nearly as you can. Give details of calculation.
22. What questions have come to you in the study of this lesson?

Note. Question 21 is optional. After completing the test sign your full name.

Food *and* Dietetics

PART II

LESSON PAPER

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American School of Home Economics

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FOOD AND DIETETICS

PART II

SPECIAL FOOD STUFFS

In the selection of foods one of the questions that will come up will be that of the relative value of animal and vegetable foods. An increasing number of people are confining their diet largely, if not exclusively, to vegetable products, while others add to these such animal substances as do not imply the taking of life, such as milk and eggs. Is a mixed diet essential for health? Or may we at will choose exclusively from the animal or the vegetable kingdom?

Certain broad distinctions between animal and vegetable food will immediately present themselves. Speaking generally, animal foods are richer in nitrogenous matter, while vegetable foods are the chief source of carbohydrates. This becomes much more evident if we compare the two in a dry condition. Milk, for instance, makes a poor showing in proteid as compared with dried peas and lentils, or even with rice. But if we take the total solids of the milk as a basis of comparison, eliminating the 87 per cent of water, the case is quite otherwise. This is the fair method, for the dried peas and rice absorb many times their weight of water in the process of cooking, so that the analysis of the raw material is quite different from that of the cooked food.

Animal
and
Vegetable
Food Stuffs

Distinction

Hutchison gives the following composition of a few typical dried foods:

One hundred parts of dried lean beef contain 89 parts of proteid.

One hundred parts of dried fat beef contain 51 parts of proteid.

One hundred parts of dried pea flour contain 27 parts of proteid.

One hundred parts of dried wheat contain 16 parts of proteid.

One hundred parts of dried rice contain 7 parts of proteid.

To this we may add:

One hundred parts of dried milk contain 25 parts of proteid.

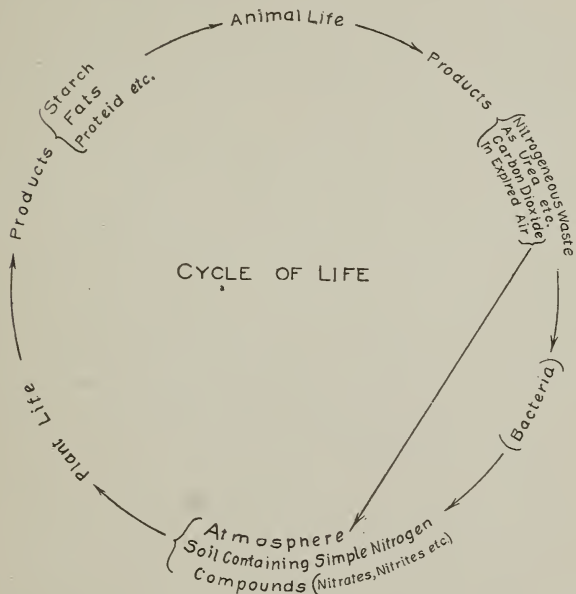
Carbohydrates

On the other hand we find our carbohydrates almost wholly in the vegetable kingdom. Milk is the only important exception to this. In milk, dried, we find 38 parts of carbohydrate to 100 of the total solids.

Comparative Cost

Another difference between animal and vegetable food is found in their comparative cost. Animal food as a rule is much more expensive than vegetable. This is not difficult to understand when we remember that our animal food has been put through a further process of manufacture than the vegetable food. If the grain raised, instead of going directly to man as food, is used to feed cattle, and these in turn are slaughtered to furnish nourishment for human beings, the process necessarily adds to the cost of the food. This process, as well as the fact that plants are in general *builders* of material, while animals *break down* the complex compounds built up by the vegetables, is graphically shown by the accompanying diagram.

The same intermediate process which adds to the cost of food increases also its digestibility, though the less complete absorption by the system of vegetable



than of animal proteid seems to lie in the fact that in the plant the proteid is enclosed within cellulose walls and ordinary processes of cooking do not always free it, rather than in any difference in the proteids themselves.

In deciding from which kingdom we shall choose

**Source of
Proteid**

our diet, we consider almost wholly the proteid. As we have seen, carbohydrates must necessarily be obtained chiefly from vegetable sources, and it seems to be a matter of indifference whether the fat of the diet is of animal or vegetable origin. With the addition of milk, butter, cheese, and eggs, it is not difficult with care to provide a satisfactory dietary without the use of meat.

**Vegetarian
Diet**

The case is different when vegetables form the only source of food supplies. Because of the great excess of carbohydrates and the presence of indigestible matter in the form of cellulose, a great bulk of food must be taken in order to get the necessary proteid. As a matter of fact, nearly all purely vegetarian diets are deficient in proteid. The extra cost of the animal proteid is justified by its availability since it may be obtained without an excess of other substances and since it is easily assimilated.

MEAT**Structure**

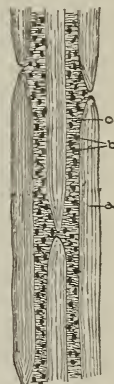
In the ordinary family the greater part of the proteid diet is probably furnished by meat, so that a knowledge of the composition and nutritive value of this article of food is important. The structure of the meat may be best seen if one with a sharp knife scrapes a small piece of meat, thus separating the muscle fibre from the white connective tissue. Under the microscope the muscle fibre is seen to consist of bundles of smaller fibres held together by delicate connective tissue in which fat cells are imbedded. These muscle

fibres vary in length in different kinds of meat, and the length of fibre probably plays some part in the digestibility of the meat—the short fibre meats being the more digestible.

The toughness or tenderness of meat depends partly upon the muscle fibres and partly upon the connective tissue, though as a rule the same conditions that have made the connective tissue tough and strong will have had a similar though less effect upon the muscle fibre. In general the muscles that are most used or most exposed to wind and weather will be both tougher and richer in flavor than those not so exposed. The young animal will, of course, have more delicate tissues and less toughened fibres than the older or harder worked animal.

The composition of different pieces of meat, even from the same animal, differs greatly, the proteid of beef, for instance, varying all the way from twelve per cent to twenty-one, according to the cut of meat and to the feeding of the animal from which it is obtained.

The proteids of meat include a number of different substances, the chief of which are fibrin, myosin and albumin. After the animal is killed the myosin coagu-



FIBRE OF
MEAT.

a Fibre
b Fat
c Connecting
tissue

Composition

Proteids
of Meat

lates, thus causing the hardening of the muscle, known as rigor mortis. In this condition the meat is very tough, and the hanging of meat is practiced in order to give time for the disappearance of this rigor by the re-resolution of the myosin.

Albumen

The presence of albumin in the meat can be easily shown by soaking a small portion of the meat in water for a few minutes, and then heating this water. The albumin dissolves in the water and coagulates upon heating just as white of egg would do under similar conditions. The scum that forms in the water when a piece of meat is boiled, is largely this same albumin. Beside the true proteids, gelatine may be obtained from meat in varying quantities. The connective tissue upon boiling becomes gelatine, and it is due to this as well as to the gelatine obtained from the bones that water in which meat has been cooked so often sets into a jelly. The color of meat is due largely to the same substance that gives the color to blood, haemoglobin. Its flavor depends chiefly upon the nitrogenous substances called extractives, though the characteristic taste of pork and mutton is caused partly by the fats they contain. These extractives have no real food value, but act as stimulants.

Flavor**Fat of
Meat**

The fat in meat varies even more in amount than the proteid; beef, as purchased, containing from five and eight-tenths per cent to more than forty per cent.

Even in meat that appears lean much fat is present lying between the muscle fibres. This may be seen

upon heating the meat in water, when globules of fat appear from even the leanest meat. The solidity of the fat is due chiefly to the stearin that is present.

The amount of water in meat varies very much. Water
A lean cut of beef may have as much as seventy-five per cent of water, while a fat piece might not contain more than fifty per cent. In general the more fat the less water there is present, so that in buying it is economy to select meat that is moderately fat.

From the standpoint of digestibility, meat is an excellent food. It is among the most easily digested of the proteid foods. As a rule raw meat is more digestible than cooked, and rarely cooked meat more digestible than that which is well done. The cooking of meat has its value not in adding to the digestibility but in developing flavor, so that the meat becomes more palatable; and in rendering it more safe, by destroying certain parasites that are sometimes present in raw meat, particularly in pork, and bacteria that under certain circumstances may cause dangerous decomposition. Factors in
Digestibility

There is much difference in the digestibility of different meats. Pork is ranked among the less digestible meats, since it requires a longer time for complete digestion than do other varieties. This is probably due to the large amount of fat closely combined with the muscle fibres. Bacon fat, on the other hand, from its different form, is generally found to be easily digested.

Mutton and beef stand equally well in this respect. As has been suggested before, short fibred meats are in general more easily digested than long fibred ones, yet veal is an exception to this. Hutchison explains this by suggesting that the fibres of veal easily elude the teeth on mastication, and that the comparatively insipid character of the veal fails to excite a free flow of gastric juice. It would seem that this absence of extractives would be the more important factor.

**Effects of
Cooking**

How far the cooking of meat alters its chemical composition is not wholly determined. Some interesting experiments at the University of Illinois have taught us much about the losses that take place in the cooking. It is shown that in whatever way meat is cooked, there is much loss of weight, amounting either in boiling or in roasting to a fourth or even a third of the original weight. This loss is partially proteid and fat, but consists still more largely of water. The loss of water appears to be caused partly, at least, by the hardening and consequent contraction of the muscle fibre, the water being mechanically forced out.

**Losses in
Boiling**

An interesting experiment has been tried in regard to the effect of salt in preventing or accelerating the losses in meat. A salt solution was prepared, having the same density as that of the juices of the meat, and a piece of meat was boiled in this. It was found that a very small amount of the juices of the meat were lost in the water and practically none of the salt penetrated

into the interior of the meat. The conclusion drawn was that very little interchange of the water and the meat juices could take place unless the medium in which the meat was cooked was either less or more dense than the meat juices themselves.

Meat does not form a cheap source of proteid food, but the cost can be lessened very much by care in selecting the cheaper cuts. As a rule these cheaper parts need longer cooking than the more expensive tender cuts, and, as has been suggested before, the fuel must be taken into account in estimating their cost. Where the cheapness of the meat is not counterbalanced by the additional expense of the fuel a great variety and a satisfactory diet may be obtained with only the occasional use of the more expensive portions. As has been said, the nutritive value of the cheaper parts is as great as that of the more tender portions.

The nutritive value of meat soups, broths and extracts has been much discussed. Often in estimating this value too little allowance has been made for the method used in preparation. A clear soup contains a very small amount of real food. Its value lies in the extractives that give it flavor, and in the small amount of gelatin that it contains, and in its power to stimulate the flow of the gastric juices, and so whet the appetite rather than satisfy it. The meat from which such a soup has been made still contains a large portion of its nutritive value, and although because of its lack of flavor it cannot be used as it is, it may be

Cost of
Meat

Soups
and
Broths

Extractives

made palatable and attractive by the addition of spice or seasoning, or by its combination with a small portion of fresh meat. Unless large quantities of soup are made, it ought to be possible, in the ordinary household, to utilize the soup meat in some way.

**Extracts
of Meat**

The commercial extracts of meat are similar to clear soup in that they contain practically nothing but the extractives. A more nutritious broth may be made if the meat, cut in small pieces, is allowed to soak for some time in cold water and then is heated to a low temperature, not above 180 degrees Fahrenheit, and kept at this point for some hours. Toward the end of the process the broth may be brought to the boiling point for a few minutes in order to dissolve all the gelatin possible. The brown flecks of albumin that form must be served in the broth and not be strained out. Even made in this way, the value of the broth is small compared with that of meat, but it is much greater than that of the clear soup.

**Beef
Juice**

Raw beef juice is valuable as a food. If the beef be cut small, and thoroughly pressed, a much larger amount of proteid is obtained than by any other treatment. The round of beef, very slightly broiled and pressed, may yield as much as seven per cent of proteid and four per cent of extractives.

FISH

**Nutritive
Value and
Digestibility**

One of the most natural substitutes for meat is fish. Its nutritive value is much like that of meat, although it contains a somewhat smaller proportion of

proteid. It also has the advantage of being as a rule easily digested, and so is particularly adapted to the needs of a person of sedentary habits. It is probably this fact that has given rise to the false idea that fish is a particularly good brain food. As a matter of fact, it is no more a brain food than meat or eggs or any other proteid food. The cost of fish is generally less than that of meat, so that it furnishes a cheap source of the necessary proteid. The value of fish depends, however, upon nearness to the source of supply much more than does that of meat, since fish deteriorates rapidly upon keeping.

For food purposes we may divide fish into white and fat fish; or we may take Hutchison's classification of, (1) fish with more than five per cent of fat, such as eels, salmon and herring; (2) fish with from two to five per cent of fat, as halibut and mackerel; and (3) fish with less than two per cent, such as cod and haddock. Fish with a small amount of fat is more easily digested than the more oily variety. Beside the proteid and fat in the fish, we obtain a certain amount of gelatine. The sturgeon furnishes isin-glass, a very pure variety of this substance.

In estimating the cost of fish, allowance must be made for the large amount of waste so that the price per pound tells by no means the whole story of its value from an economic standpoint. The following analysis by Miss Williams shows the waste in

Classification
of Fish

Cost
of Fish

cooked fish as served at the table, and also the amount of nutrient present.

Composition of Fish

Fish	Part analyzed	Per cent Waste, Bones, etc.	Per cent Gelatin	Per cent Water	Per cent Nutrients
Sardines ..	Whole	4.91	.....	42.17	52.92
Salmon ...	Section	5.99	0.53	61.06	32.02
Trout.....	Whole	8.23	0.55	67.12	24.10
Eels.....	Heads removed.....	11.66	1.09	53.29	33.96
Mackerel..	Whole.....	10.51	0.25	65.21	24.03
Cod.....	Section	15.99	0.43	63.78	19.79
Salt cod ..	Section	6.13	0.33	67.68	25.85
Haddock ..	Whole	35.10	0.80	46.46	17.61
Whiting...	Whole	21.50	0.86	61.29	16.35
Turbot....	Anterior and head..	31.20	0.59	53.09	15.12
Halibut....	Section	6.84	0.03	69.35	23.78
Plaice ..	Flesh .....	.....	.....	79.85	20.14
Soles.....	Whole	22.02	0.74	61.18	12.06
Oysters....	Shell contents.....	.....	.....	77.71	22.29
Smelts....	Whole	18.86	0.38	65.20	15.56

Variety
in Diet

Fish, beside being an economical source of nitrogenous substances, has much value in satisfying the demand for variety in food. Any lack in nutrients is frequently supplied by the sauces with which it is served, and by the fat used if it is fried. It would seem to be an error from the standpoint of food values to serve a rich sauce with a fish like salmon that already contains a high proportion of proteid and a large amount of fat, but an egg sauce served with a light fish like cod or haddock has its justification, not only in the additional flavor imparted, but in the additional food value.

Shell
Fish

Oysters may be taken as a good type of the various shell fish that we use. The analysis of oysters shows a composition somewhat similar to that of milk,

although they are higher in nitrogen and lower in fat than milk.

Average Composition of Oysters. (Langworthy.)

(Exclusive of liquid.)

Water.....	88.3
Nitrogenous substances.....	6.1
Fat.....	1.4
Carbohydrates.....	3.3
Salts.....	1.9

When milk is seven cents a quart and oysters are twenty-five, the amount of food material purchased for a given amount differs greatly in the two. When oysters are fifty cents a quart they must be distinctly regarded as a luxury, used for the purpose of providing variety, and not as a valuable source of food. Oysters are one of the few animal foods that contain a large amount of carbohydrates. These are present in the liver of the oyster in the form of glycogen.

The oyster is especially easy of digestion, but this digestibility is lessened by cooking. This is particularly true when the oyster is overcooked. An objection to the use of the raw oyster is that during the so-called fattening of the oyster, that is done in shallow water, it may become contaminated with typhoid germs derived from sewage. Some noted epidemics have been traced to this source. This simply means that greater care should be taken in the supervision of such a food supply in order that it may be protected from such possible contamination.

Of other shell fish commonly used, clams have a similar composition to that of oysters, but contain

**Comparative
Cost**

Digestibility

**Clams
Lobsters**

a tougher muscle, while lobsters and crabs are generally considered somewhat indigestible because of the firmness and compactness of their fibre. The difficulty here seems partially at least to be the failure to properly masticate the flesh, as is true in so many other cases, and also the difficulty of obtaining the food in an absolutely fresh condition.

Dried and
Smoked
Fish

Dried and smoked fish deserve a place in the diet for the sake of variety, and because, since the water has been eliminated, a large amount of food material is obtained for a small amount of money. The use of certain varieties of canned fish has become general. Salmon is perhaps the most satisfactory of these. Special care should be taken in using canned fish to remove it immediately from the can after it is opened, and to use it within a short time. Fish that has been frozen should be cooked immediately after thawing, since it decomposes much more rapidly than fish which has not been frozen.

Cooking

Fish, particularly some varieties, such as cod, occasionally contains parasites, but these are destroyed by thorough cooking. It is essential that *all* fish used should be thoroughly cooked, although this does not mean that it should be cooked at a high temperature. A temperature of from 180 to 200 degrees Fahrenheit continued long enough to coagulate the proteid and render the fish opaque instead of clear, gives far more satisfactory results than boiling.

As in other cooking of flesh, this principle is apparently violated when fish is cooked in a hot oven, or

fried, but as a matter of fact, the violation is only true so far as the outside layers are concerned, and this sacrifice is made in order to keep the shape of the fish and to develop the flavor.

Comparative Costs of Protein and Energy as Furnished by a Number of Food Materials at Certain Prices

Kind of Food Material.	Price per pound.	Cost of protein per pound.	Cost of energy per 1000 calories.
	<i>Cents.</i>		
Codfish	10	\$0.94	\$0.49
Codfish steaks	12	.71	.36
Bluefish	12	1.22	.59
Halibut	18	1.18	.38
Cod, salt	7	.44	.22
Mackerel, salt	10	.68	.11
Salmon, canned	12	.55	.13
Oysters, "solids" (30 cents per quart)	15	2.50	.65
Oysters, "solids" (60 cents per quart)	30	5.00	1.30
Beef, sirloin	25	1.53	.26
Do	20	1.23	.21
Beef, round	14	.77	.16
Beef, stew meat	5	.36	.07
Beef, dried "chipped"	25	.97	.32
Mutton chops (loin)	20	1.54	.14
Mutton leg	22	1.48	.25
Pork roast (loin)	12	.85	.39
Pork, smoked ham	22	1.65	.13
Milk (7 cents per quart)	3½	1.06	.11
Milk (6 cents per quart)	3	.91	.09
Lobster	18	3.05	1.24
Wheat flour	3	.27	.02
Corn meal	2	.22	.01
Potatoes (90 cents per bushel)	1½	.88	.05
Potatoes (45 cents per bushel)	¾	.44	.02
Cabbage	2½	1.79	.20
Corn, canned	10	3.57	.22
Apples	1½	5.00	.07
Bananas	7	8.75	.22
Strawberries	7	7.00	.33

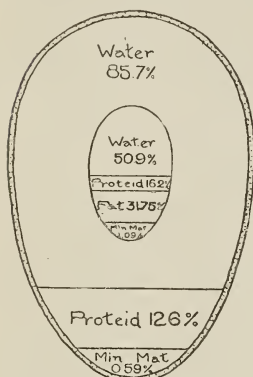
From *Fish as Food*

EGGS

One of the most general substitutes for meat is the egg. One would at first thought expect eggs to be of much the same composition as milk, since each fur-

Composition

nishes food for the growing animal, but when the different conditions are considered, the reason for the variation in this respect is readily seen. The egg must contain a large amount of nourishment in the most compact form. It must furnish all the materials nec-



(After Hutchison.)

Diagram showing Composition of White and Yolk of an Egg.

White
and
Yolk

The white of the egg contains twelve per cent of proteid, with practically no fat and a small amount of mineral matter, while the yolk has sixteen and two-tenths per cent of proteid and almost thirty-two per cent of fat.

The greater part of the mineral salts are also in the yolk, although the sulphur that causes the blackening of the silver spoon with which we eat our egg is chiefly in the white.

essary for growth, but it does not need to provide for activity to the extent that milk does. Consequently we find the carbohydrates wholly absent, and a much larger proportion of solid material than is present in milk. The solids are in the form of proteids, fourteen and eight-tenths per cent; fat, ten and a half per cent; and mineral salts, one per cent. This refers to the edible part only.

While eggs form a valuable meat substitute, it is difficult to use them wholly in the place of meat, since it takes so many eggs to equal a pound of meat. From eight to nine eggs constitute a pound. If the eggs have the composition given and meat contains eighteen per cent proteid, it would require about twelve eggs to furnish as much proteid as one pound of meat; and one who would have no difficulty in eating half a pound of beefsteak at a meal, would not wish to eat an equal weight of eggs.

Eggs like meat need to be supplemented by carbohydrate material. Bread and eggs furnish a satisfactory combination as well as bread and meat. Raw eggs are usually considered more easily digested than cooked eggs, although some experiments show that the cooked egg leaves the stomach in a shorter time than the uncooked. This is explained by the statement that the raw egg is digested largely in the intestine. Its failure to excite the secretion of gastric juice in the stomach makes it possible to use raw eggs in the diet when the stomach requires rest.

Hard cooked eggs take a longer time to digest than those lightly cooked, but from recent government experiments they seem to differ little in the completeness with which they are digested, an egg boiled three minutes having 8.3 per cent of its nitrogen undigested at the end of five hours; one boiled for five minutes having 3.9 per cent undigested, and one boiled for twenty minutes having 4.2 per cent remaining. Eggs

Digestibility

cooked at 180 degrees Fahrenheit for five and ten minutes respectively were totally digested in five hours. Possibly the rapidity of the digestion of the hard cooked egg may depend on the fineness of mastication.

Cost Whether eggs are to be used freely depends largely upon their price. Eggs at fifteen cents a dozen may be so used, while at fifty cents a dozen they can not be regarded as an economical source of food.

MILK

Milk is often called a perfect food. This is true, however, only in a limited sense. Hutchison gives five tests of a perfect food.

Tests of
a Perfect
Food

First, such a food must contain all the nutritive constituents required by the body; proteids, fats, carbohydrates, mineral matter and water.

Second, it must contain these in their proper relative proportions.

Third, it must contain, in a moderate compass, the total amount of nourishment required daily.

Fourth, the nutritive elements must be capable of easy absorption, and yet leave a certain bulk of unabsorbed matter to act as intestinal balance.

Fifth, it must be obtainable at a moderate cost.

Of these tests milk meets only the first perfectly. It contains the two proteids, casein and albumen. It contains the fat so familiar to us in the form of cream and butter. The carbohydrates are represented in it by milk sugar or lactose. The mineral salts are par-

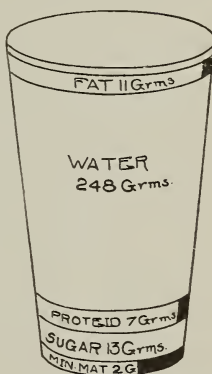
ticularly valuable, and consists chiefly of calcium compounds, including calcium phosphate.

When we come to the second test, we find a different condition. An average sample of milk contains 87 per cent of water, three and three-tenths per cent proteid, four per cent fat, and five per cent carbohydrate, with seven-tenths of one per cent mineral matter. This proportion is of course right for the young animal, who demands a large proportion of muscle-building food, but it is far from a desirable proportion for the adult.

Remembering that the nutrient ratio is about one to five, or to put it in another form, that the adult requires approximately five times as much carbohydrate (or its equivalent) as proteid, we see that milk must be supplemented by some food containing a large proportion of carbohydrate before it can adequately supply the needs of the adult. As a matter of fact, experience has taught us to use with milk such a food as bread, thus supplying the needed starchy material.

The third condition is not met better than the second. At least four quarts of milk a day would be necessary for the complete nutrition of a healthy man doing a

Proportions
of Nutrients



(After Hutchison.)
Composition of a Glass
of Milk.

Nutrient
Ratio

moderate amount of muscular work. Milk also is lacking in the bulk of unabsorbed matter that it leaves.

Cost The fifth condition may or may not be fulfilled. In the city the price of milk is too high for it to be an economical source of food if used exclusively. On the other hand in the country the price of milk is often so low that this condition might be fulfilled.

A comparison of the food value obtained from one pound (a pint) of milk and from that of a similar weight of some common article of food, is given, with the cost of each at prices taken from two different sections of the country:

Comparative Food Value of Milk

1 lb. of milk	furnishes	.033 lbs. proteid	.04 lbs. fat	.05 lbs. carbohydrate
1 " " sirloin steak	"	.165 " "	.161 " "	no "
1 " " eggs (8 eggs)	"	.131 " "	.093 " "	no "
1 " " bread	"	.092 " "	.013 " "	.531 lbs. "
1 " " potatoes	"	.018 " "	.001 " "	.147 " "
(one 60th bu.)				

From milk	at (.04 per qt. or .02 per lb.)	1 lb. of proteid costs \$.60
" "	" (.07 " " " .035 " ")	1 " " " " 1.06
" sirloin steak	at .18 a lb.)	1 " " " " 1.09
" " "	" .25 " "	1 " " " " 1.52
" eggs	at (.15 per doz. or .10 per lb.)	1 " " " " .76
" " "	" (.36 " " " .24 " ")	1 " " " " 1.83
" bread	at .05 per lb.	1 " " " " .54
" " "	" .08 " "	1 " " " " .87
" potatoes	at .60 per bu. or .01 per lb.	1 " " " " .56
" " "	" \$1.20 " " " .02 " "	1 " " " " 1.11

In addition to the proteid, the money invested would have purchased, in the case of milk more than a pound of fat and of sugar; in that of meat an equal amount of fat; in the case of bread more than five pounds of starch; in that of potatoes nearly seven pounds of

starch ; while three-fourths of a pound of fat would be furnished by the eggs.

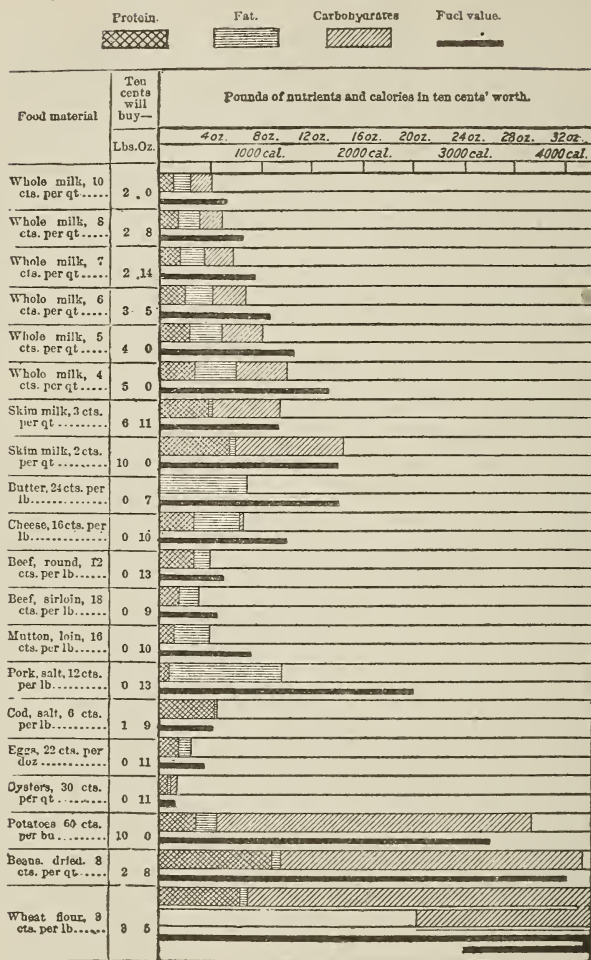
Even at city prices milk might well be substituted to a certain extent for other proteid foods. The habit of many people of using milk simply as a beverage in addition to the food required, is perhaps responsible for the fact that many people find milk indigestible ; the difficulty lies not with the milk but with the overabundance of food. An experiment was tried at the Maine Agricultural College on the effect of a limited and an unlimited amount of milk at the University boarding house. These experiments are reported in the Government Bulletin called *Milk as Food*, and the following conclusions are drawn :

**A Food
Not a
Beverage**

“First, the dietaries in which milk was more abundantly supplied was somewhat less costly than the others, and at the same time was fully as acceptable. Second, the increased consumption of milk had the effect of materially increasing the proportion of protein in the diet. Third, the milk actually supplied the place of other food materials, and did not, as many suppose, simply furnish an additional amount of food without diminishing the quantity of other materials. Fourth, the results indicate that milk should not be regarded as a luxury, but as an economical article of diet which families of moderate income may freely purchase as a probable means of improving the character of the diet and of cheapening the cost of the supply of animal food.”

**An
Economical
Food**

Chart of the Pecuniary Economy of Milk and Other Foods at Given Prices



We may conclude that while it would not be economical to obtain our total food supply from milk, it is good economy to use it freely in connection with other foods to furnish part of the proteid of the diet.

The digestibility of milk varies very much with the method in which it is taken. If a small amount of liquid rennet or of the junket tablets so commonly found in the market, be added to a portion of warm milk, a thick clot forms. This is similar to the process that takes place in the stomach after milk has been swallowed. Milk properly, then, so far as its digestion is concerned, is a solid rather than a liquid food. Its digestibility depends largely upon the way in which this clot is formed. If the milk be swallowed rapidly, so that the rennin acts upon a large mass at once, one large clot is formed. If, on the other hand, the milk be sipped slowly, or eaten from a spoon, the action is slower and the curd is broken.

Digestibility

The same result in a more marked degree is obtained by the addition of certain substances, such as lime-water, to the milk: or by the mixing of the milk with bread, as is done in eating bread and milk. Some people who cannot use milk in its ordinary form have found that they could digest it without difficulty if a cracker were rolled into fine crumbs and stirred into the milk. The digestive juices that would act slowly upon a large mass of curd, act readily upon the same amount when it is broken into small clots.

Addition
to Milk

Boiled milk has generally been considered less diges-

**Boiled
Milk**

tible than uncooked milk, but some experiments seem to contradict this. The experiment station bulletin states that when cow's milk has been boiled before it is taken into the stomach it is likely to be precipitated in a more flocculent form. Hutchison says that it has been found in the case of infants and calves that sterilized milk which has been kept at or above the boiling point for more than an hour is absorbed quite as well as milk which has merely been boiled in the usual way, and he concludes that boiling does not appreciably diminish the digestibility of milk.

On the other hand, the government bulletin states, after acknowledging that the results of experiments upon the subject are conflicting, that "the more common experience seems to indicate that cooking or heating the milk makes the proteids somewhat more difficult for most persons to digest, but there are exceptions to this rule, if it be a rule, for there are persons who cannot take fresh milk with comfort but with whom boiled milk agrees very well."

In this case as in many others we must wait for a larger number of experiments to be made before we can make very dogmatic statements.

**Buttermilk
Koumiss
Skim-milk**

Buttermilk is considered an especially digestible form of milk, while koumiss or fermented milk is of still greater value in this respect. Skim-milk deserves more general use than it has, since the proteid of the milk nearly all remains in this, and it is for the proteids

that we especially value the milk. Where skim milk is sold at a low price, it is economy to use it freely in cooking, supplying the needed fat in a less expensive form than cream.

The Composition of Milk

The composition of milk has already been stated in a general way. If we examine it more in detail, we find that the proteids of milk consist chiefly of two: casein or, as it is sometimes called, caseinogen. This forms about three per cent of the total of the milk. It is held in solution more or less completely by the salts of lime present in the milk. When acid is added to the milk, or it becomes sour, this casein is precipitated. When rennet is added the casein is coagulated and is changed in chemical composition. The scum that forms upon heated milk is chiefly casein.

Casein

The other proteid present in milk is lact-albumen. This coagulates when the milk is heated for a long time. It is present in much smaller amount than the casein, forming only about one-seventh of the total proteid of the milk.

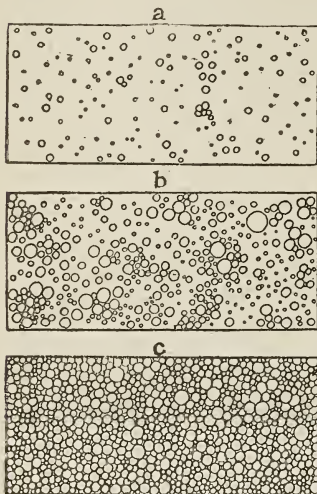
Lact-Albumen

The sugar of the milk, forming between four and five per cent, is called lactose or milk sugar. It has two important characteristics. It lacks the sweetness usually associated with the name of sugar, having only a very slight sweet flavor, and it is considered the most digestible form of sugar, apparently fermenting in the

Milk Sugar

stomach or intestines with much less ease than do other sugars. For both of these reasons it is particularly suitable for the use of infants or invalids. The commercial article is obtained from milk, and is sold in the form of a fine white powder looking not unlike

Fats



Fat Globules of Milk Magnified
200 Times.

a Skim Milk. *b* Whole Milk.
c Cream.

Mineral Matter

The mineral matter of milk consists largely of potash and lime salts, and of these salts the phosphates are the most abundant. These are important, not only in the building of bone tissue, but also, as has been suggested before, in holding the casein in solution.

pulverized sugar. Aside from its use as a food it is extensively used in the preparation of pills.

The fat of milk is present in the form of an emulsion. If one looks at a drop of milk through the microscope one sees a large number of tiny fat globules. That the fat is so finely divided is a factor in its digestibility, though fat derived from milk, either in the form of cream or butter, is also considered particularly digestible.

Water forms about 87 per cent of milk, and its chief use in this form is in holding other materials in solution. To compare milk with other foods, we should properly think of the solid ingredients alone, since the water has no more food value than water in any other form.

Water

Milk readily undergoes many changes, some of them harmless and some more or less harmful. The most common change is that of souring. Bacteria present in the milk act upon the sugar and change it into lactic acid. After a certain amount of this acid has been produced, the growth of the bacteria is stopped, and no further change in the sugar takes place, though undoubtedly certain other changes take place both in the fat and in the proteid.

Souring

There is no evidence that sour milk is unwholesome. The objection to it seems to be chiefly one of taste. Its use in cooking produces good results, and many prefer it for some purposes to sweet milk since it seems to produce a more tender product than does the sweet milk. On the other hand, milk may under the action of certain bacteria produce most harmful products, and poisoning from these ptomaines is not uncommon where milk has been handled in an uncleanly manner and has been poorly cared for. A more serious danger from milk is that owing to the excellent food it furnishes for almost all bacteria, it is frequently a carrier of disease. Disease germs that in water would not multiply and would probably live only for a short

Use of
Sour
Milk

time, multiply abundantly in milk. It is because of the possibility of the presence of these harmful bacteria, rather than from any danger from sour milk, that we guard our milk supply carefully. Each hour that elapses between the milking of the cow and the use of the milk by the consumer, increases the number of bacteria present. One cubic centimeter of milk frequently contains from 400,000 to several million bacteria.

**Pure
Milk**

Efforts to guard the milk supply have been directed in two ways. The sterilization or pasteurization of all milk is often recommended; but a more satisfactory method would seem to be the insuring of cleanly conditions upon the dairy farm where the milk is produced. The next essential after cleanliness is that the milk should be cooled rapidly when first milked, since the lower temperature makes the fluid less favorable for the growth of germs.

**Care of
Milk**

In the household milk should be kept in perfectly clean vessels, and should be loosely, not tightly, covered, in order that there may be access of air to it, since the absence of fresh air favors the growth of certain putrefactive organisms. The entirely open vessel is only allowable in perfectly clean surroundings, not only free from dust, but with no strong flavoring substance near from which odors could be absorbed.

**Condensed
Milk**

One form in which we often get milk is that of evaporated or condensed milk. This is simply milk

from which most of the water has been removed, and which has been made sterile by heating to a high temperature. It has usually been sweetened, and the sugar acts as a preservative. While it is a convenient form for use when fresh milk is not obtainable, its large amount of sugar renders it somewhat undesirable as a common article of diet, and also makes it unfit for many cooking purposes.

There is being put upon the market now milk powder that seems to consist chiefly of the curd of the milk dried and ground. With the addition of water it forms a very fair substitute for milk.

**Milk
Powder**

Milk is perhaps more often adulterated than any other common article of diet. The most common form of adulteration is that of skimming or removing part of the cream. This can easily be detected, because it increases the specific gravity of the milk. To counterbalance this, water, which is slightly lighter than milk, is added in such proportion that the twice adulterated milk gives the same test as if it had not been tampered with at all.

Adulteration

Another adulteration that is sometimes practiced is that of adding coloring matter to the milk. This is usually done in order to conceal the blueness of the milk, when it has been watered.

Preservatives are frequently used. Of these boric acid is probably the least harmful, though some authorities contend that formaldehyde in the minute quantities in which it is used has no physiological

Preservatives

effect. A milk that will stand in a warm place for some hours and show no tendency to sour is open to the suspicion of having been treated in some such way. Ordinary cooking soda is sometimes added to neutralize the acidity that may be present because of the age of the milk. Salicylic and benzoic acids are sometimes found, while formaldehyde is used most of all.

MILK PRODUCTS

Butter

The importance of milk is hardly greater than that of its two chief products, butter and cheese. Butter consists chiefly of the fat of the milk with a small amount of water, of casein and of salt, with sometimes a little milk sugar. The average amount of fat contained is 82 per cent. The fats which are present may be put into two classes: Those derived from the so-called "fixed" fatty acids, and those from the volatile fatty acids. The fixed fatty acids are present in the form of stearin, the chief ingredient in beef fat, and of palmitin and olein. The amount of the volatile acids present differentiate butter from most of the other fats that we commonly use as food. The flavor of butter is produced apparently by the action of bacteria upon the cream, the different flavor of butter at different times of the year coming largely from differences in the kind and amount of bacteria that find their way into the milk. The "ripening" of the cream is often induced by artificial cultures of the proper bacteria. Many buttermakers abroad and in

some sections of our own country, depend entirely upon these bacterial cultures for the production of their butter flavor.

The rancidity of butter may be produced by changes taking place in the casein that is present, or from a decomposition of the fats themselves. Cooking lessens the digestibility of butter as it does that of other fats, probably because of the decomposition that takes place when fats are subjected to a high temperature, and the consequent freeing of irritating fatty acids.

Changes

The adulteration of butter consists chiefly in a substitution of other substances, either in whole or in part, for the butter fat, or of an inferior and "doctored" article. The coloring of butter is almost universal, but it is so generally accepted that it can hardly be classed as an adulteration, although it surely shows a false standard in foods when we insist upon buying a deep yellow compound colored with annatto or some other foreign material instead of the delicate straw-colored substance that most natural uncolored butter is.

Adulteration

The substitutions spoken of are chiefly either what is called renovated butter, or oleomargarine. Renovated butter is made by taking different lots of stale or rancid butter, melting it, allowing the curd to settle, and re-churning the fat with a small amount of milk. The product is certainly better than the rancid butter, but it cannot compare in flavor and in wholesomeness with fresh butter, and certainly should not be sold as such.

**Renovated
Butter**

Butterine

Oleomargarine, or butterine, is made by clarifying the fat of beef and churning it in milk. It differs from butter in its composition in that it contains practically no curd, and is lacking in the volatile fatty acids that are present in the butter and characteristic of it. It is a cheaper product than butter, and the temptation to put it upon the market under the name of butter has consequently been great. There is absolutely no reason, however, why, sold under its own name, it should not be a very general article of use. There seems nothing to show that it is materially less digestible than butter itself; it does not grow rancid with the ease that butter does, and it is made in a perfectly cleanly and wholesome way, certainly so far as the best quality of it is concerned. Even if it is artificially colored, this is no worse than is true of butter. The difference in taste between it and butter is rather in an absence of the aroma that we find in the best butter, than in any disagreeable flavor present. Indeed, although each person thinks to the contrary in regard to himself, few people are able to distinguish it from butter by taste. It may be used in almost every way as a butter substitute. It is perfectly satisfactory to use in the making of sauces or upon vegetables or meat. It does not make so light a cake as butter, and is not satisfactory for this purpose, except that in a plain cake it may be substituted for part of the butter; and it cannot be used in candy making as, for some reason, it fails to combine with the other

materials and always separates out upon cooling. Since it is so much cheaper than butter it would be well to use it as a substitute for part of the more expensive material.

The present law in regard to it has lessened its sale to a great extent since it can no longer be artificially colored, but it is certainly only prejudice that prevents our accepting a pure white fat instead of a bright yellow one.

Cheese, so far as nutritive value is concerned, stands almost at the head of our list of foods. Since it is made from the curd of the milk, and the water has largely been disposed of in the whey, while the fat is carried down with the curd, we have the most important part of the milk solids in a condensed form. The composition of the different varieties of cheese varies to quite an extent, but in a rough way we may say that cheese is one-third proteid, one-third fat and one-third water. Mineral salts are abundant as well, while a small amount of milk sugar is sometimes present.

Cheese

Cheese is prepared by the addition of rennet to milk. Coloring matter is generally added, and salt. After the curd has set, it is cut in small pieces and the whey allowed to drain off. The curd is then put into a press and allowed to remain for a few hours. After this the real curing or ripening of the cheese begins, and this process is allowed to go on for months in order to develop the flavor. This flavor is produced

Cheese
Making

by the action of bacteria, different varieties of bacteria giving us the different flavors of the various kinds of cheese.

Digestibility

While there is no question as to the nutritive value of cheese, there is more doubt as to its digestibility. In many countries cheese is used largely as a substitute for meat, and wherever it can be digested this is certainly a rational thing. Some people who have delicate digestions have no difficulty in digesting cheese, while others find it an extremely indigestible food. One difficulty seems to be that the cheese is frequently not chewed enough, and the digestive organs have to cope with lumps of the material.

**Effects of
Cooking**

Cheese generally proves more digestible if it is finely divided and mixed with some starchy material like bread crumbs or macaroni. Another factor in its digestibility is the temperature at which it is cooked. Like all proteid foods, it is toughened and hardened by a high temperature. This is very evident in the case of such a dish as a Welsh rarebit, where over-cooking produces a tough, stringy, most indigestible mass. In combining cheese with such a dish as macaroni it is well not to allow the cheese to be at the bottom or the top of the dish, but to protect it from the high temperature by putting it between the layers of starchy material.

Matthieu Williams, in his chemistry of cookery, suggests the use of a little bicarbonate of potash, the old-fashioned *salaratus*, to make the cheese more

soluble and therefore more digestible. Sometimes after the cheese has become tough from the action of too high a temperature, it may be again made soft by the addition of this substance, or of baking soda. Hutchison suggests that the disagreeable effect that cheese has upon some people may be due to small quantities of fatty acids produced in the process of ripening. The philosophy of the use of cheese at the end of a dinner seems to be that the cheese in small quantities aids the digestion of other foods, even though it is not always easily digested itself. Wherever, then, cheese can be used and digested without difficulty, it forms an excellent article of food, one that should be used more freely than is done at present.

Importance

CEREALS AND THEIR PRODUCTS

The most important of all our vegetable foods are without doubt cereals. Not only do they contain a large amount of nutriment, chiefly, but by no means wholly, in the form of carbohydrates, but their areas of growth are widely distributed, and their power of adaptation to different climates and conditions is usually great. This alone would render them exceedingly



PROBABLE NATIVE HOME OF THE GRAINS.

(From *Corn Plants* By Fredric LeRoy Sargent.)

important as food for the human race. Of them all wheat is undoubtedly the most important from its wide distribution and its power of adaptation to different conditions. Rice follows closely in importance, while corn, oats, rye, barley and millet each have an important place in the food of the world. The home of the

cereals seems for the most part to have been Central Asia, nearly all, except rice and corn, originating there. Corn is supposed to have originated in Mexico. From these centers their production has spread through all parts of the world.

A comparison of the composition of some of the different cereals in forms commonly used is given in the following table:

Composition

Composition of Cereals.

	Per Cent of Water.	Per Cent of Proteid.	Per Cent of Carbo- hydrate.	Per Cent of Fat.
Wheat flour (entire).....	11.4	13.8	71.9	1.9
Cornmeal.....	12.5	9.2	75.4	1.9
Oatmeal.....	7.3	16.1	67.5	7.2
Rye flour.....	12.9	6.8	78.7	.9
Barley meal and flour.....	11.9	10.5	72.8	2.2
Barley (pearled).....	11.5	8.5	77.8	1.1
Rice.....	12.3	8.	79.	.3

Wheat derives its special importance from the fact that it will grow in so many different climates and under so many varying conditions. It may be sown either in the fall or in the spring, and receives its name of winter or spring wheat, according to the time of the planting. Many varieties are found, such as red wheat and white wheat, hard and soft wheat.

Wheat

The hard wheats contain a larger proportion of gluten, and therefore a smaller proportion of starch than do the soft wheats. Wheat from which macaroni is manufactured, is an exceedingly hard variety. Successful attempts have been made within a few years to grow macaroni wheats in this country, and much of it is now produced in Dakota. Though hard wheat is

Varieties

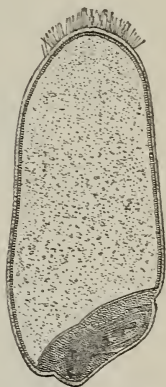


THE PRINCIPAL GRAINS.
(Redrawn from *Corn Plants*.)

used chiefly for making pastes like macaroni, excellent bread can be made from it also, as is shown by experiments made at the So. Dakota Agricultural College.

Winter wheats as a rule are softer than spring wheats. So-called pastry flour is made from the softer wheats. Much of our bread flour is now made from mixtures of winter and spring wheat, and great care is exercised in the combining of these in order to keep an even standard.

The process of manufacturing flour is carried out differently by different manufacturers, so far as its details are concerned, but the main features are the same. The wheat as it comes to the mill is first of all cleaned, by screening to get rid of any large foreign substances that may be present in it, and by "scouring" to get rid of the fine dirt that may adhere. The next process is that known as breaking. The wheat is cut by corrugated iron rollers provided for the purpose. There are generally five breaks in all. Each "break" is put through a number of siftings. The meshes of the bolting cloth through which this sifting is done are graduated in size, and the products accordingly vary in



Section of a Grain
of Wheat.

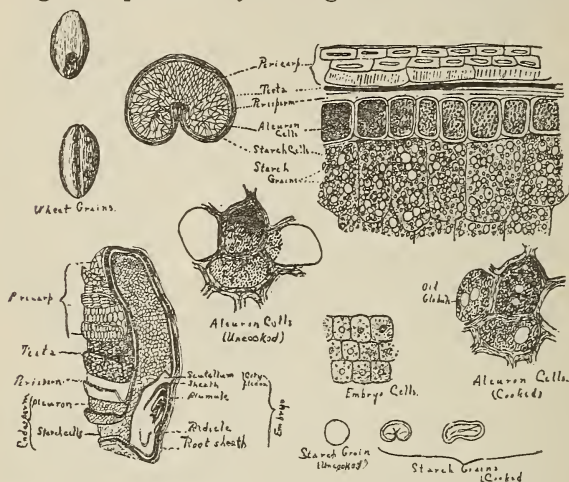
From a Maine Exp.
Station Bulletin.

Flour

Bolting

Scalping

fineness. The finest particles are called the dustings, the coarsest are the scalpings, while between these are the middlings,—germ, medium and fine. The scalpings from the first break undergo a second breaking and are again separated by sifting as in the first break,



SECTIONS OF A WHEAT GRAIN SHOWING THE STRUCTURE AND DIFFERENT PARTS.
(From Original Drawings.)

and this process continues through all the breaks.

Mixing
and
Testing

The flours on the market are made from mixtures of the products of the different breaks. When a flour is mixed it is tested by making a portion of it into a small loaf and baking it, and comparing this loaf with that made from some standard flour. The scalpings from the last break constitute the bran. This is al-

most wholly cellulose and is therefore not digestible by human beings, but much of the so-called graham flour on the market is simply a mixture of white flour with some of this bran.

Whole wheat flour is made by grinding the entire kernel of wheat. The outer coating of cellulose is thus divided into exceedingly small particles, so that it is less irritating to the digestive organs than when used in the form of large pieces of bran.

Whole
Wheat

There is little difficulty today in obtaining good flour, but the different brands vary in composition, and so do different lots of the same brand, in spite of the effort to keep them constant. This means that a different treatment must be used. It is well, then, in the household, to experiment a few times with a new lot of flour before condemning it as poor and returning it.

Flour

Some false standards have been set up in regard to flour. The best bread flour is not pure white, but yellowish in tint. It readily retains the impression of the fingers, if a little is pressed together in the hand. It always has a slightly gritty feeling, while pastry flour is much smoother and more velvety to the touch.

Standard

Within a few years the use of cereals as breakfast foods has become general. We have now not only the standard meals, which have been used for a long time, but a multitude of patent preparations as well. The Maine agricultural experiment station found that of fifty varieties of cereals purchased in the market, only

Break-fast
Foods

about twenty had been on sale for more than three years. Many of these are only new in name, or differ very slightly from those before used. Within a short time there has been added to our list of breakfast cereals many that claim to be predigested foods, and some that make absurd claims with regard to their wonderful food value, while others stand for what they are, without pretence.

Probably there is comparatively little to choose between different preparations of the same grain, so far as their chemical composition goes. The analysis of the uncooked food, however, by no means represents the composition of the cereal as we eat it. An analysis of boiled oatmeal, for instance, gave: Water, 84.5 per cent; protein, 2.8 per cent; carbohydrate, 11.5 per cent; fat, 5 per cent. Comparing this with the analysis of oatmeal given on p. 99, we find only about one-sixth the per cent of nutritive material, with a corresponding increase of water. A cereal that would absorb a greater weight of water would show still greater variation.

**Digestibility
of Cereals**

The digestibility of the cereals is influenced by the coarseness of the particles. The coarser foods are highly desirable in many cases, especially where a sluggishness of the intestines exists, and in other cases are very irritating to the delicate lining of stomach and intestine. Individual needs must determine the use of each.

Most of the cereals, even those that are steam

cooked, need much more cooking than is ordinarily given them in order to sufficiently hydrate the starch. Of the foods supposed to be ready to eat, it is difficult to speak definitely, for lack of careful experimentation. In most of them a certain proportion of the starch has been converted into dextrin and sugar. Two questions arise in regard to this. Has the starch been sufficiently changed so that it no longer is indigestible as uncooked starch; and is it desirable to have the starch digested? There seems to be a tendency in our modern life to depend too largely upon predigested foods, particularly in the case of children. This means a tendency toward the lessening of the power to digest. It is certainly a question whether it is not best to take our starch undigested but in such a form that it can be easily acted upon by the digestive juices, rather than to have the work done outside the body.

BREAD

History Bread was one of the earliest foods of man. That it was used long before history was written, the discoveries of modern times have shown us. In Switzerland, in the lake dwellings of prehistoric times, there have been found not only stones for grinding meal and baking bread, but even bread itself, in the form of round cakes. The first mention of bread in literature is in Genesis, in the words of Abraham to the angels, "I will fetch a morsel of bread." The Egyptians knew the art of breadmaking, and baked loaves and cakes in great variety of form and flavor. One ancient Greek writer names sixty-two kinds of bread in use; and in Rome there were many bakeries, where not only was the baking of bread done, but the grain was pounded and sifted, to prepare it for use.

**Kinds of
Bread**

In our own day bread is found in a great variety of forms, many of them characteristic of certain nations; familiar examples are the black bread of Germany, the oat cakes of Scotland, the hard rye cakes of northern Sweden, baked only twice in the year, and the passover cakes or unleavened bread of the Jews.

Bread forms the staple food of a large section of the human race, and is often the only means of subsistence of the very poor. Mr. Goodfellow, in some investigations made in London, found that in the worst districts fifteen per cent of the children ate only bread for the

twenty-one meals of the week, while forty per cent more had other food only two or three times a week.

It is essential that so universal a food should be nutritious, palatable, and digestible. To fulfil these conditions, the flour used must be rich in nutriment; the bread must be light and porous, that as large a surface as possible may be exposed to the digestive juices; and the cooking must develop the flavor, and render the food materials assimilable to the greatest possible extent. The necessary ingredients of bread are flour of some variety and liquid for moistening it. Salt for flavoring is required by almost every one, and to most of us the term bread implies some agent for lightening the dough.

Good
Bread

Wheat is the flour most commonly employed not only because of its widespread growth but because of the presence in it of the proteid called gluten, or more strictly speaking, of the proteids that upon the addition of water form gluten. Gluten is an important aid in the making of bread light in that being an elastic tenacious substance it retains the gas as it is formed in the dough. In the process of cooking, the gluten hardens and thus enables the loaf to retain its shape. This function of gluten may be compared to that of soap in the water from which soap bubbles are blown.

Wheat
Bread

If some gluten be prepared from flour, as in the experiment on page 41, and baked, the value of this substance in lightening the dough will be appreciated.

**Other
Breads**

Of the other cereals, rye makes the lightest bread as its proteids form with water a sticky substance not so elastic or tenacious as the gluten of the wheat, but sufficiently so as to retain much gas. Corn flour, however, makes only a flat and crumbly loaf unless egg be added to increase the elasticity of the dough.

The most desirable bread flour is one rich in gluten.

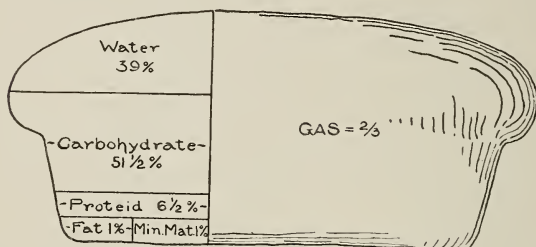


DIAGRAM SHOWING COMPOSITION OF A
LOAF OF BREAD.

(After Hutchison.)

Even very hard macaroni wheat may be made into excellent bread as has been shown at the South Dakota Agricultural Experiment Station. If a flour poor in gluten and rich in starch is to be used a stiffer dough must be made than with the opposite conditions. In spite of the efforts of the manufacturers to maintain a constant standard in flour each barrel varies somewhat, and slightly different treatment may be needed.

**Leavening
Agents**

Many different agents for lightening the dough have been used at various times. The ancient leaven was made by allowing flour and water to stand in a warm

place till it fermented. Part of this dough was used to start the fermentation in a new mixture of flour and water. In some sections of our own country "salt rising" bread is commonly used. In England aerated bread, made by forcing carbon dioxide under pressure into the dough, has been advocated and used to some extent.

The most common method of lightening the loaf, in this country at least, is by means of yeast. Yeast comes into the household in three forms, that of liquid yeast, compressed, and dried yeast. The last is most often used by those too far from the source of supply to obtain compressed yeast in good condition. It makes satisfactory bread, but the process is a long one, as time must be allowed for the dry yeast to take up water and renew its life processes. Liquid, or home brewed yeast, prepared usually from potato with the water from a few hops, frequently with the addition of sugar and flour, and the whole fermented by means of the addition of a "pitching" yeast, is much less used than formerly. Aside from the trouble of preparation, it is open to the disadvantage of usually containing many bacteria and wild yeasts. Many think, however, that the fine texture and delicious flavor of old fashioned home made bread was due in part to the use of this yeast.

Compressed yeast is a by product of the distillery or the brewery. It is skimmed from the top of the fer-

Yeast
Bread

Compressed
Yeast

menting liquor, is washed, strained, mixed with a small amount of starch and pressed into large cakes. At the distributing centers it is cut and wrapped in foil and sold for one or two cents, according to locality. It is, on the whole, the most satisfactory yeast to use in bread making, though it is rarely, if ever, free from the bacteria that cause the souring of bread when conditions are right for their growth.

**Chemical
Process**

The changes that take place in the process of bread-making are largely those of fermentation. Some of the starch of the flour is changed to sugar, and the sugar is broken up into alcohol and carbon dioxide. If the fermentation goes too far the alcohol is changed to acetic and other acids and the bread becomes sour. Yeast is not the sole agent working; bacteria and not yeast are responsible for the souring, while the change of starch into sugar is probably accomplished by bacteria or some enzyme (ferment) present in the flour.

Chemical changes, such as the change of some of the starch into dextrin and some of the sugar into caramel, which takes place especially in the crust of the bread, are caused by the heat of the oven, while the same agent is responsible for the driving off of the alcohol and carbon dioxide present.

**Methods
of Making**

A few years ago bread was almost invariably made by what is called the long process. A small amount of yeast was used and the bread was allowed to rise over night. Now more often the bread is set in the morning and the whole process is carried through in six hours.

The advantage of the latter method is that it makes it possible to watch the process and regulate the temperature more carefully than can be done if the bread is set at night. As temperature is an important factor in the growth of the yeast, too low a temperature hindering its growth, and too high a temperature favoring the growth of the acid producing bacteria, this is a distinct advantage. The most favorable range of temperature is from 75 degrees to 90 degrees F.

On the other hand, the long process produces a loaf of a texture preferred by many, and some experiments tend to show that it may be slightly more digestible.

There has been discussion for many years over the comparative value of graham, whole wheat and white bread. Several years ago graham bread was urged upon every one as the only satisfactory bread. After a time the conclusion was reached that the coarse particles of the graham flour were too irritating to the intestinal wall, and its use was discouraged except where this very irritation was desirable, as in case of constipation. Then came the era of whole wheat bread, showing like the graham a high percent of nutriment. At one time it seemed to be considered almost a crime to use any other bread than this. The presence of phosphates in larger amount than in white flour and the higher proportion of proteid seemed a sufficient reason for encouraging its use by every one.

Graham
and Whole
Wheat Bread

The latest government investigations have proved

White Bread
More
Nutritious

that this was a false assumption. While from the chemical standpoint it is true, from the physiological one it is not. Less of the material of whole wheat bread is available for use in the body, or in other words, a larger proportion is excreted in the feces than in white bread, so that whole wheat is not superior to white bread in *real nutritive value*. It is hurried through the intestines more quickly and thus given less chance for absorption than is true of the white bread. The phosphates are so closely attached to the outer cellulose wall that they probably do not furnish any more material to the body than is obtained from bread made of white flour.

Combinations
with Bread

Although bread contains a fair proportion of proteid, about 9.2 per cent, it has too little proteid, too little fat, and too large an amount of starch to form in itself a perfect food. Instinctively we supplement it with these lacking ingredients. We use butter on our bread, we eat bread with meat, or we combine it with milk. In either case we are supplementing it admirably. Eggs, too, contain the lacking fat and proteid. Nuts eaten with bread and cheese so much used in many countries have scientific sanction.

Good bread is one of the cheapest, most nutritious, most easily and completely digested of all foods and well deserves its title the "Staff of Life."

SUGAR AS FOOD

Mrs. Abel, in the government pamphlet *Sugar as Food*, calls attention to the fact that the consumption of sugar is everywhere increasing. In England eighty-six pounds per capita and in the United States sixty-four pounds per capita were consumed in the year 1895. This means simply the sugar that is manufactured in this form, and does not include that taken in the form of various fruits and vegetables.

Consumption

The desire for sugar seems to be universal, and the fact that children always crave it would seem to be an indication that it is needed in their diet. On the other hand, we must remember that the manufacture of sugar is comparatively a late matter, and that earlier, a hundred years or so ago, people got along without it except as naturally present in their foods.

In using sugar it must be remembered that it is a highly concentrated food, and that it is therefore not to be used in such large quantities as would be right in the case of foods containing a large amount of water. It seems best fitted for assimilation by the body when it is diluted or used with other foods that give it the necessary bulk. It is also an error to use sugar, as is so often done, with other foods in such a way or in so large an amount as to disguise the natural flavor of these foods.

Concentrated
Food

One of the advantages of sugar is that it passes quickly into the circulation, so that the energy obtained

from it is available in a very short period. It is particularly fitted for food in cases of exhaustion.

The bad effects of sugar are ascribed by Mrs. Abel to its use in too great quantity. Three or four ounces a day can be disposed of by the healthy adult with impunity. It has generally been thought that sugar is injurious to the teeth, but this also is denied. Any bad effects of this kind are due not to sugar in the diet, but to the allowing particles of sweet food to refer acid fermentation and possible injury to the teeth.

**Sources
of Sugar**

The source of most of the sugar used until a few years ago was the sugar cane. Now over half of the sugar used in the world is obtained from the sugar beet. In 1904, only about 10 per cent of the sugar used in the United States came from the sugar beet. There has been an impression that beet root sugar is less satisfactory for many purposes than the cane sugar, but it is identical chemically. It may be true in some cases that the beet root sugar has not been completely purified, and that these impurities give an odor to the sugar upon boiling, and possibly affect some of its uses; but the properly prepared sugar may be used in every way that sugar from the sugar cane may; indeed, it is impossible to distinguish between them.

Glucose

Another sugar of which we hear a good deal is glucose. This has been made much of as an adulterant, particularly of candy. There is, however, no reason to think that glucose is less digestible or less

easily assimilated than cane sugar. Indeed, it is more nearly ready for assimilation. When we boil sugar for any length of time in the presence of an acid, we change a certain amount of the sugar into glucose. Candy that will stretch we may be sure contains at least some of its sugar in this form. If glucose is pure and properly prepared there is no reason to fear it as an adulterant of candy. The cheap coloring matter and flavors that are used in some of the cheap candies are more to be feared, since some of them are harmful.

It is possible that since glucose goes so rapidly into circulation it may overload the system more readily than would plain sugar, and it is more easily fermented.

Maple sugar, regarded as a delicacy, is simply cane sugar plus the flavoring matters found in the maple tree. Milk sugar is generally considered the most easily digested form of sugar and it less easily undergoes fermentation.

Maple
Sugar

Cane sugar is on the market in various forms. Ordinary powdered sugar is, of course, the same substance as granulated sugar, but more finely ground. This is often considered adulterated because it is less sweet than the granulated form, but the lack of sweetness is due to the finely divided condition. A very simple test will serve to show the presence of adulterants since these would probably be either some form of porcelain clay, or starch. If the sugar dissolves in water neither of these can be present.

Powdered
Sugar

The brown sugars that we use are simply cane sugar that has not been decolorized, or has been only partially so treated.

Molasses

Molasses formerly was obtained as a bi-product in the manufacture of sugar, and was the part of the sugar-cane juice that would not crystallize, containing a large per cent of glucose. With modern methods of work and with the coming in of beet sugar, whose molasses has such a strong flavor that it cannot be put upon the market, a manufactured molasses came into use. The commercial molasses of the present day is frequently glucose, prepared from starch, colored and flavored with a small amount of molasses from the sugar factories. Sometimes the light molasses has been bleached, and the bleaching agents, unless completely removed, may be injurious. Sorghum molasses is also used in some sections.

**Effect
on Diet
of Use
of Sugar**

One comparison in regard to the addition of sugar to the diet may be interesting. In the case of milk, it has been found that an addition of this in any large amount to the diet means a corresponding decrease in the amount of other foods used. This seems not to be true of sugar. When sugar is furnished freely in abundance, it does not decrease the use of other foods, but sometimes by adding to the flavor of these actually increases their consumption. On the other hand, the desire for sugar often marks an inadequate diet.

TEST QUESTIONS

FOOD AND DIETETICS

PART II

Read Carefully. The following U. S. Government Bulletins should be read in connection with this lesson: No. 34, Meat Composition and Cooking; No. 85, Fish as Food; No. 128, Eggs and their Use as Food; No. 74, Milk as Food; No. 112, Bread and the Principles of Bread Making; No. 93, Sugar as Food. These may be obtained free by addressing the Department of Agriculture, Washington, D. C. Place your name and address on the first sheet of the test. Leave space between answers. *Make your answers full and complete.*

1. What is the relative value of animal and vegetable foods?
2. What are the chief nutrient ingredients of meat? How may the presence of some of these be shown? What reasons are there for cooking meat?
3. Compare clear soup, beef broth, and beef juice as to their nutritive value.
4. What meat substitutes may be used in the daily diet, and how does their value compare with that of meat?
5. In what ways does milk satisfy the requirements of a perfect food? How does it fail?
6. What is the approximate composition of milk? Under what conditions is its free use economical?
7. Give the composition of butter. How does cooking affect its digestibility?
8. What is renovated butter? How may oleomargarine be used and how does it compare with butter in wholesomeness?
9. Describe the process of cheese making.

FOOD AND DIETETICS

10. What is the food value of cheese? With what foods should it be combined?
11. What can you say of the value of the cereals as food?
12. If scales are available weigh out a portion of rice (about $\frac{1}{4}$ cup), boil, and weigh again. If the scales are not at hand, measure the rice carefully, before and after cooking. How does the composition of the cooked rice differ from that of the uncooked? Repeat the experiment with a potato and compare results.
13. Why is wheat so extensively used? What is its especial value in bread making?
14. What are the chief steps in the manufacture of flour?
15. What are the tests for a good flour? Why is a flour high in gluten desirable for bread?
16. What are the characteristics of good bread?
17. Compare the nutritive value of whole wheat and white bread. When is graham bread valuable?
18. What kinds of yeast are in common use? What are the advantages and disadvantages of each?
19. State the chief changes that take place in the process of bread making and baking.
20. What is the value of sugar as food? How does beet sugar differ from that obtained from the cane? What can you say of the adulteration of sugar?
21. Ask one or more questions on this lesson.

Note.—After completing the test, sign your full name.

Food *and* Dietetics

PART III

LESSON PAPER

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FOOD AND DIETETICS

PART III

VEGETABLES

An increasing importance is coming to be attached to the use of vegetables and fruits in the diet. Not only vegetarians but many others have found from experience that it is possible to live largely upon vegetable food, while those who use meat freely lay great stress upon the vegetable accompaniments whether in the form of salads or of cooked vegetables.

A study of vegetables from the standpoint of botany would imply their classification according to the parts of the plant used; whether leaf, as in the case of lettuce, cabbage, spinach; stem, as in celery, asparagus, potato (a tuber, or underground stem); root, as in beet, carrot and sweet potato; flower, as cauliflower; or fruit, as squash, cucumber, tomato.

From the standpoint of cookery the most important classification is that of *strong flavored* and *sweet flavored* vegetables, since this modifies our method of cooking; right methods leading us to retain all the juices of the latter as far as possible, while we legitimately discard part of the extract of the former. For example, green peas and string beans, young carrots, and squash, should be cooked in a small amount of water, or have the water in which they are cooked concentrated at the end so that it may all be served

Botanical
Classification

Flavor
Classification

with the vegetable; while in the case of onions we may well use a large portion of water, and throw it away. It is true that in this latter case we may lose valuable salts and some nutriment, but these we sacrifice for the sake of improved flavor.

**Nutritive
Classification**

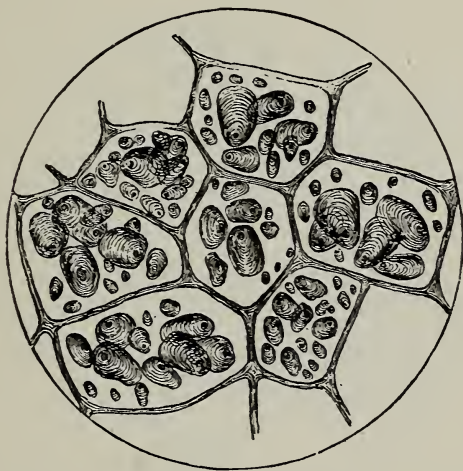
From the standpoint of diet a better classification would be into *nutritive vegetables* and *flavor vegetables*. With the latter we should include those that contain mineral salts, but have little food value. Of this class, lettuce, spinach, cabbage, tomato and cucumber are types; while rice, potatoes, peas, beans and lentils furnish examples of the former. Many vegetables will be on the border line between the two.

The composition of vegetables varies in general from that of animal foods in that here we have the carbohydrates largely represented. The chief carbohydrates of vegetables are starch, sugar, and cellulose of various types.

**Cellulose of
Vegetables**

The fact that cellulose forms the framework of the plant and that it is within cellulose walls that the starch as well as the proteid of the plant are contained, is important in two ways. While cellulose is only slightly digested by human beings (only so little of it in young and tender plants really serving as a food that the amount may be neglected), it does have a more or less important function in furnishing the required bulk of food. If one undertakes to live wholly upon a vegetable diet, this bulk generally becomes too great; on the other hand, one of the objec-

tions to an exclusively animal diet is in the absence of bulk. Since the digestive juices do not act upon cellulose to any extent, and the nutritive portions of the vegetables are enclosed within walls of this sub-



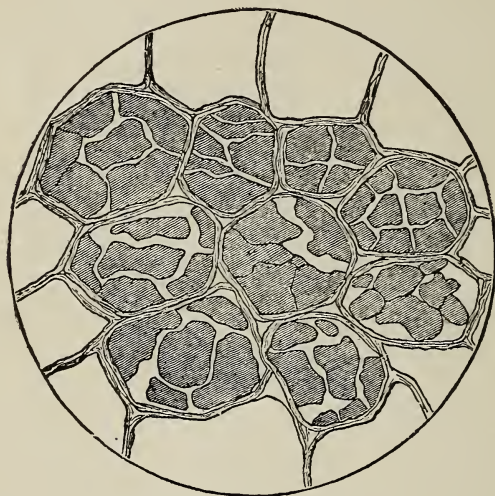
STARCH OF A POTATO ENCLOSED IN CELULOSE CELLS.

stance, the province of cooking is to so change the cell wall that the nutritive materials may be set free, or the digestive juices penetrate to them.

We usually speak of softening the cellulose by means of cooking. Apparently what we really do is to dissolve the intercellular substances that bind the walls together, and thus make it possible for the cell walls

Effect of
Cooking on
Cellulose

to be mechanically ruptured, either in the process of cookery or by the pressure exerted in the mouth. Part at least of this intercellular substance belongs to the pectin group that causes the jelling of fruit juices.

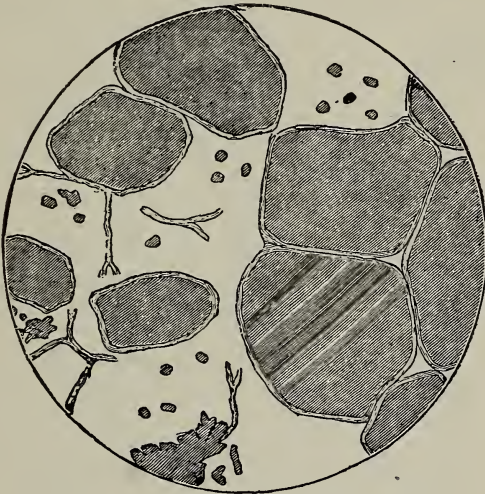


SWELLING OF THE STARCH.

Hydration
of the Starch

The first process in rendering the starch of the vegetable digestible is one of hydration. It is important, therefore, that an abundance of water be present when starch is cooked. Some vegetables like the potato contain so much water that the necessary amount for the starch is supplied within the vegetable itself. The

grains and other dry vegetables need to have a large amount supplied. The swelling of the starch grains upon hydration is probably an important agent in the rupturing of the cellulose cell wall already referred to.



THE CELL WALLS RUPTURED.

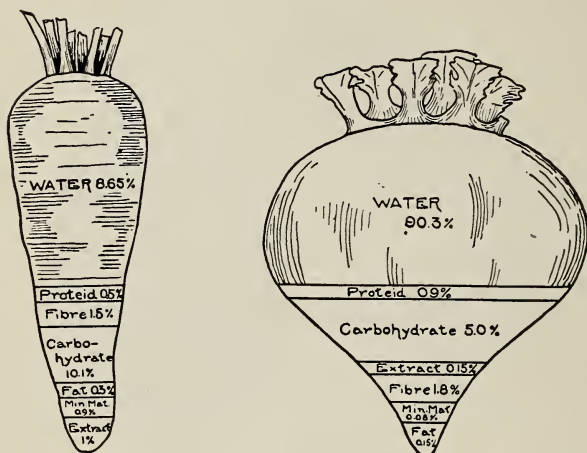
Sugar is the soluble carbohydrate of the vegetable, as starch is the insoluble form in which this nutriment is stored. Some vegetables, such as carrots, show large amounts of sugar, while starch is absent from this part of the plant. Other typical vegetables containing a large amount of sugar are beets, pars-

Sugar in
Vegetables

nips, artichokes, sweet potato. Onions, cabbage, and some varieties of peas, string beans, squash and sweet corn all contain a fair amount.

Vegetables containing a large amount of starch are

**Starchy
Vegetables**



COMPOSITION OF THE CARROT AND TURNIP.

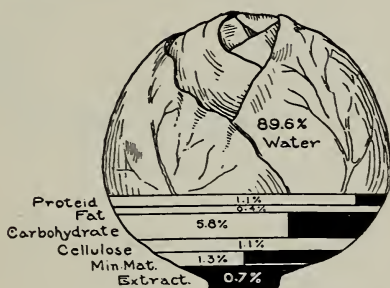
(After Hutchison)

represented by potato, sweet potato, rice, peas, beans and lentils. Some vegetables containing a large amount of cellulose are squash, potato, beet, celery, cabbage.

**Proteid of
Vegetables**

As a rule, we do not look to the vegetable world for our main supply of proteid, yet some of our vegetables, notably the legumes, do contain an abundant

supply of this food principle. Whether this is as available for use in the body as the proteid in meat is often questioned. With ordinary cooking processes it evidently is not, but with long continued heat the matter is different. That there is no inherent difference between vegetable and animal proteid, so far as



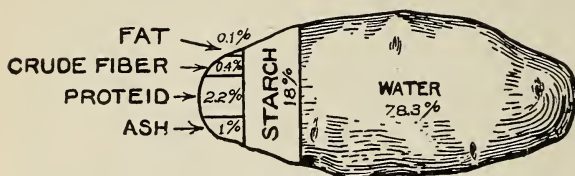
COMPOSITION OF THE CABBAGE.

Blackened portions represent amount dissolved in cooking.

its digestibility is concerned, would seem to be indicated by the fact that when the vegetable is finely divided, as in the case of some of the vegetable meals, it is absorbed to a greater extent than in its ordinary form. It is said, for instance, that when lentils are soaked and boiled until soft, 60 per cent of their proteid is absorbed, while in the lentil meal 90 per cent is utilized by the body. No careful experiments have been made to see what proportion of the boiled lentils would have been absorbed if the cooking had been continued for several hours. There is every reason,

Digestibility
of Vegetable
Proteid

however, to think that the percentage would be increased. Anyone who has compared dry peas or beans cooked two hours, or until they have just become soft, with those cooked from eight to twelve hours will realize the difference in the result.



COMPOSITION OF THE POTATO.

The
Potato

Among the vegetables, the potato, in this country at least, is the most generally used. It has of late been decried as having no food value. This is far from true. It has, of course, a small amount of proteid, some of which is lost in the process of cooking. Its mineral salts are less in amount than in many vegetables, and are partially lost in the cooking. Its chief value as food lies in the starch it contains, and in the fact that its very absence of strong flavor makes it acceptable day after day.

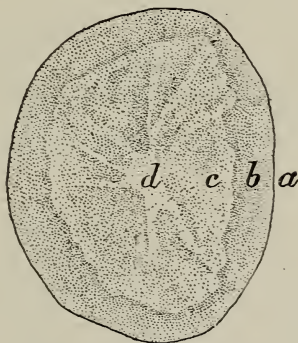
Salts of
Vegetables

Vegetables should be in our diet not only for their food value but for their mineral salts as well. The bad effect of the failure to use a certain proportion of vegetables and fruits, has long been known. Scurvy has usually been attributed to this error in diet, while it is quite possible that some minor disorders of the

digestion are attributable to the same cause. Cabbage, lettuce, celery, onion, spinach and the different leaves used as greens find their value almost wholly in the presence of mineral salts.

Mushrooms have often been considered of great value, from the proteid they contain, but it seems certain now that this value has been much exaggerated,

Mushrooms



SECTION OF A POTATO.

a—Outer Skin. *b*—Inner Skin or Fibro-vascular Layer. *c*—Flesh.
d—Inner Flesh.

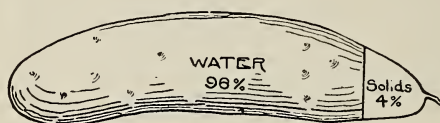
and that the reason for using them as articles of food lies in their pleasant flavor and the variety they give, rather than in the amount of nutriment they furnish the system.

The digestibility of different vegetables must always be difficult to ascertain, so far as any one individual is concerned. Not only the presence of cellulose, but

Digestibility
of Vegetable

of acids, as in the tomato, of nitrogeneous substances, such as asparagin found in asparagus, and of volatile flavors, as in the onion, all affect this question.

There has been within a few years a great gain in the abundance and variety of vegetables available. Formerly in winter choice was confined to cabbage.



COMPOSITION OF THE CUCUMBER.

turnip, squash, onions and a few others. Now a visit to the market of a large city, even at the least promising time of year, shows an overwhelming variety of fresh vegetables. If we add to these the numerous canned vegetables of excellent quality available (and these are increasing in variety constantly) and the dried vegetables, like the peas, beans and mushrooms even, that are obtainable, we have no excuse for limiting our diet so far as vegetables are concerned.

True economy will consist not in cutting down the supply but in choosing fresh vegetables at the time when each is most abundant and therefore cheapest, and presumably at its best, and in supplementing these by the judicious use of the canned or dried product, not forgetting the ordinary winter vegetables.

Average Composition of Vegetables

NAME	Refuse	PERCENTAGE COMPOSITION OF EDIBLE PORTION						†Calories, per lb.
		Water	*Carbohydrates	Fiber	Nitrogenous	Fats	Ash	
Beans, dried.....	.....	12.6	55.2	4.4	22.5	1.8	3.5	1,605
Beans, string.....	7.0	89.2	5.5	1.9	2.3	.3	.8	195
Peas, dried.....	.....	9.5	57.5	4.5	24.6	1.0	2.9	1,655
Peas, green.....	45.0	74.6	15.2	1.7	7.0	.5	1.0	465
Potatoes.....	20.0	78.3	18.0	.4	2.2	.1	1.0	385
Sweet Potatoes.....	20.0	69.0	26.1	1.3	1.8	.7	1.1	570
Sweet Corn.....	61.0	75.4	19.2	.5	3.1	1.1	.7	470
Parsnips.....	20.0	83.0	11.0	2.5	1.6	.5	1.4	300
Carrots.....	20.0	88.2	8.2	1.1	1.1	.4	1.0	210
Beets.....	20.0	87.5	8.8	.9	1.6	.1	1.1	215
Turnips.....	30.0	89.6	6.8	1.3	1.3	.2	.8	185
Onions.....	10.0	87.6	9.1	.8	1.6	.3	.6	225
Cabbage.....	15.0	91.5	4.5	1.1	1.6	.3	1.0	145
Spinach.....	.....	92.3	2.3	.9	2.1	.3	2.1	110
Squash.....	50.0	88.3	8.2	.8	1.4	.5	.8	215
Tomatoes.....	.....	94.3	3.3	.8	.9	.4	.5	105
Lettuce.....	15.0	94.7	2.2	.9	1.2	.3	.7	90
Celery.....	20.0	94.5	2.3	1.0	1.1	.1	1.0	85
Cucumbers.....	15.0	95.4	2.4	.5	.8	.2	.7	80

*Not including fiber.

†Including fiber and thus higher than fuel value available in the body.

The substances grouped under carbohydrates in the above table are chiefly starch, sugar and pectose bodies. Church states that turnips contain no starch or sugar, only pectose, but one of the analyses of the Department of Agriculture showed one sample to contain over 4% of sugar. The carrot contains sugar and pectose, but no starch; parsnips, sugar, starch and pectose. The nitrogenous matter is only in part proteid; in potatoes about 57%; in carrots, onions, cabbage, cucumbers, lettuce, about one-half.

FRUITS

Classification of Fruits

Fruits may, like vegetables, be classified as *flavor* fruits and *food* fruits, and again these two classes will run together so that we shall have difficulty in deciding where certain ones belong. The apple, the orange, the strawberry, although all having a certain food value, are used so largely for their flavor and to give variety, that these may well be put under the head of the flavor fruits. Bananas form, perhaps, the best common example of the food fruits. Bread fruit, so largely used in the tropics, is another representative of this class.

Dietetic Value

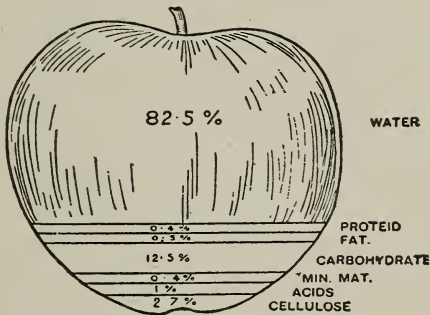
From a dietetic standpoint the most important function of fruits is that of furnishing mineral salts and organic acids to the body. The potash salts are considered especially important. Some fruits, like the pineapple, contain ferments that are said to be aids to digestion. Fruits are generally laxative in effect,—apples, figs, prunes, peaches and berries are particularly effective in this respect, especially if taken between meals or at the beginning of a meal.

Nutritive Value

Their chief nutritive value is given to fruits by the carbohydrate group. This is largely in the form of sugar, while the remainder consists chiefly of vegetable gums, among which may be included the “pectin bodies” that give to fruits their power to form jelly. Starch may be present in unripe fruits, but disappears as the fruit ripens. Bananas, as we use them, contain a small amount of starch. Of fresh fruits very few contain more than one per cent of nitrogenous matter, not all of which is proteid.

Dried fruits may be without question put under the food fruits, dates containing sixty-six per cent of carbohydrate, prunes approximately the same amount, figs about sixty-three per cent, while raisins furnish seventy-five per cent. Raisins in this respect stand almost at the head of the list of concentrated foods since they furnish so much nutriment in so small a

Dried
Fruits



COMPOSITION OF AN APPLE.

(After Hutchison.)

bulk. When fresh fruits are not obtainable dried fruits may well take their place. These are usually less expensive than fresh fruits, and properly cooked go far to make up for the absence of the fresh varieties.

Canned fruits are increasingly used, and many who formerly thought it necessary to put up large amounts of fruit at home, are now purchasing those canned on a commercial scale. Whether this is a wise thing or

Canned
Fruits

not depends on the amount of fruit available for the housekeeper at a low cost, the price of sugar, and the time and strength at her disposal. Often the fruit commercially canned is really superior to that prepared at home for the reason that the canning is done where the fruit is easily obtainable in its freshest and most perfect condition. When canned fruit is as reasonable in cost as it is at present, the housekeeper should certainly be very sure that her time cannot be used to better advantage before she undertakes to prepare quantities of fruit at home.

Perhaps no article of diet has increased in use during the last few years so rapidly as fruits. Not only the most hardy, but the more perishable varieties, including berries, are by improved methods of transportation, by the use of refrigerator cars and by increased areas of cultivation made available through a longer season, and at greater distances from the source of supply than ever before. The fruit industries, including the cultivation of the fruit, the great canning and drying establishments, and the transportation of the product, have become of immense importance in the commercial world.

New
Varieties

New varieties of fruit produced by careful selection and cross fertilization are constantly appearing. Some of the most important changes that have been induced by cultivation have been the lessening of the proportion of cellulose, the production of seedless varieties, the increase in size and the development of fine flavors.

As in the case of vegetables, the digestibility of fruits is largely an individual matter. Bananas may be eaten freely by many, even by children, while others fail to digest even a small portion. Strawberries, generally considered easily digested, are actual poison to some people. The chief benefit of a table of digestibility is as a guide for experimentation. In feeding a child, for instance, one would try first the fruits considered most digestible.

Aside from the personal equation, ease in mastication is one of the important elements in the digestion of fruits, as in the case of other foods. The banana, for instance, easily slips down the throat in large pieces; the blueberry can be swallowed whole, while such a fruit as the apple is naturally more thoroughly masticated, for ease in swallowing, and the orange almost falls apart of itself.

The difference in the digestibility of ripe and unripe fruits is generally attributed to the larger proportion of cellulose in the latter; this and the excess of acids in unripe varieties is held responsible for their ill effects.

Gilman Thomson gives among the commoner fruits easy of digestion: grapes, oranges, lemons, cooked apples, figs, peaches, strawberries and raspberries; while he classifies as somewhat less digestible: melons, prunes, raw apples, pears, apricots, bananas and fresh currants. Dried currants and citron he considers "wholly indigestible," while he gives as the most use-

**Digestibility
of Fruits**

ful fruits for invalids: lemons, oranges, baked apples, stewed prunes, grapes, banana meal.

Young children and those of delicate digestion should avoid all skin and seeds of fruit.

Average Composition of Fruits

	Refuse	PERCENTAGE COMPOSITION OF EDIBLE PORTION						†Calories, per lb.
		Water	*Carbohydrates	Fiber	Nitrogenous	Fats	Ash	
Bananas	35.	75.3	21.0	1.0	1.3	.6	.8	460
Grapes	25.	77.4	14.9	4.3	1.3	1.6	.5	450
Plums	5.	78.4	20.1	?	1.0	.....	.5	395
Cherries	5.	80.9	16.5	.2	1.0	.8	.6	365
Huckle berries .....	.....	81.9	16.6	?	.6	.6	.3	345
Apples	25.	84.6	13.0	1.2	.4	.5	.3	290
Pears	10.	84.4	11.4	2.7	.6	.5	.4	295
Black berries .....	.....	86.3	8.4	2.5	1.3	1.0	.5	270
Apricots	6.	85.0	13.4	?	1.1	.....	.5	270
Peaches	6.	85.0	10.5	?	.5	.....	.6	.....
Oranges	27.	86.9	11.6	?	.8	.2	.5	240
Raspberries (red)	?	85.8	9.7	2.9	1.0	.....	.6	255
Cranberries .....	.....	88.9	8.4	1.5	.4	.6	.2	215
Lemons	30.	89.3	7.4	1.1	1.0	.7	.5	205
Pineapple .....	.....	89.3	9.3	.4	.4	.3	.3	200
Muskmelon	50.	89.5	7.2	2.1	.6	.....	.6	185
Strawberries	5.	90.4	6.0	1.4	1.0	.6	.6	180
Watermelon	60.	92.4	6.7	?	.4	.2	.3	140

* Not including fiber.

† Including fiber.

The carbohydrates of fruits are chiefly in the form of sugar. Nearly all contain pectin bodies and these are most abundant in unripe fruit. The acids of the fruits are here included under the carbohydrates. Apples, pears and peaches contain malic acid; lemons and oranges, citric acid; grapes, tartaric acid; rhubarb, oxalic acid, etc.

Average Composition of Dried Fruits

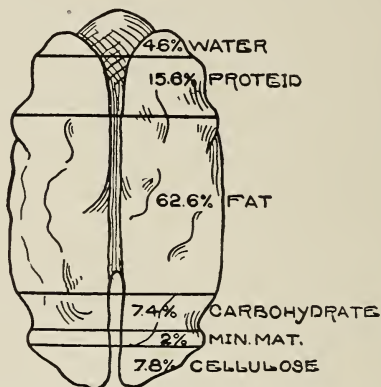
	Refuse	PERCENTAGE COMPOSITION OF EDIBLE PORTION					
		Water	*Carbohydrate	Nitrogenous	Fats	Ash	*Calories, per lb.
Dates.....	10.0	15.4	78.4	2.1	2.8	1.3	1,615
Raisins.....	10.0	14.6	76.1	2.6	3.3	3.4	1,605
Currants.....	.....	17.2	74.2	2.4	1.7	4.5	1,495
Figs.....	.....	18.8	74.2	4.3	.3	2.4	1,475
Prunes.....	15.0	22.3	73.3	2.1	.....	2.3	1,400
Apples.....	.....	28.1	66.1	1.6	2.2	2.1	1,350
Apricots.....	.....	29.4	62.5	4.7	1.0	2.4	1,290

* Including fiber.

NUTS

Nutritive
Value

The form of fruits that we know as nuts has a very different place in diet from that of the ordinary fruit. We find here foods having a nutritive value that compares favorably with that of the most nutritious substances. Almond kernels for instance contain twenty-one per cent of proteid, fifty-four of fat, and seventeen



COMPOSITION OF AN ENGLISH WALNUT.

of carbohydrates, while peanuts are richer still in proteid and also contain a large amount of fat. Indeed, nuts often may well be substituted for meat, and have the advantage that they supply at the same time a certain amount of carbohydrates. Some nuts, as chestnuts, are very rich in the latter. The table given is taken from the experiment station bulletin, *Nuts as Food*, and shows the composition of some of the most common nuts.

Average Composition of Nuts

	Refuse	PERCENTAGE COMPOSITION OF EDIBLE PORTION					
		Water	Protein	Fat	Carbohydrates	Ash	Calories, per lb.
Almonds	64.8	4.8	21.0	54.9	17.3	2.0	3030
Brazil Nuts	49.6	2.7	8.6	33.6	3.5	2.0	1545
Filberts	52.1	3.7	15.6	65.3	13.0	2.4	3290
Hickory Nuts	62.2	1.4	5.8	25.5	4.3	.8	1265
Pecans	49.7	2.9	10.3	70.8	14.3	1.7	3445
Walnuts	58.0	2.8	16.7	64.4	14.8	1.3	3305
Chestnuts	16.1	31.0	5.7	6.7	39.0	1.5	1115
Butternuts	86.4	.6	3.8	8.3	.5	.4	430
Cocoanuts	48.8	7.2	2.9	25.9	14.3	.9	1415
Cocoanuts, shredded .....	.....	3.5	6.3	57.3	31.6	1.3	3125
Pistachio .....	.....	4.2	22.6	54.5	15.6	3.1	3010
Peanuts	26.4	9.3	27.9	42.0	18.7	2.1	2640
Roasted Peanuts	32.6	1.6	30.5	49.2	16.2	2.5	2955
Peanut Butter .....	.....	2.0	29.3	46.6	17.1	5.0	2830

Much has been said about the indigestibility of nuts, but this probably comes largely from the fact that nuts are most usually eaten at the end of a hearty meal after the appetite has been completely satisfied. If nuts were more often taken as a substitute for a part of the meat of the meal, there would probably be less difficulty with regard to their digestion. Another important factor in their digestibility as in the case of other foods, is that of their finely divided condition; often they are insufficiently masticated. Some of the nut meals and pastes on the market are valuable because of their fine division, and their use as a meat substitute certainly has a rational basis. Peanut butter is the most common of these preparations.

Digestibility
of Nuts

TEA, COFFEE AND COCOA

The common beverages, tea, coffee and cocoa, are in such general use today that it is difficult to realize that two of them were not introduced into Europe until the seventeenth century, and the other only a hundred years earlier, though other nations had known them long before. Tea drinking began in Japan in 692 A. D., while coffee, though not known to the Greeks and Romans, had been used in Abyssinia and Ethiopia from time immemorial.

Varieties of Tea

The tea plant seems to be a native of Assam, a province of Burmah, but it has been grown in China and Japan for fifteen hundred years. Two different types of the plant are illustrated by the Assamese and Chinese varieties. The tea of Assam grows luxuriantly, but is sensitive to drought, cold or winds. Its leaves are of bright green, sometimes reaching a size of nine inches in length and three in width, while the young leaf is of soft texture and golden color. It may produce as many as twenty "flushes," or successive crops of young leaf during each picking season. The Chinese plant is tough and hardy, able to endure severities of climate, and to grow in poor soil with deficient moisture. The leaf is smaller, tougher and darker than that of the Assam tea plant. Between these two extremes exist all varieties of tea. Most varieties produce three or four crops a year.

The tea plant produces small white flowers which eventually yield the seed from which cultivated tea is

raised. In cultivating the plant an effort is made to produce abundant young leaf, since good tea is made from this alone. Pekoe tea is the choicest variety. The undeveloped bud at the end of a young shoot is

**Pekoe
Tea**



TEA LEAVES.

a—Flowery Pekoe. *b*—Orange Pekoe. *c*—Pekoe. *d*—Souchong (first).
e—Souchong (second). *f*—Congou. *h*—Bohea.

called the pekoe tip, or flowery pekoe. It is said that this tea rarely comes to this country. From it is made Mandarin tea, that commands a very high price in its native country. The next leaves produce orange pekoe and pekoe. Souchong is the next larger leaf and Congou the next. A still larger leaf formerly on the market more generally than now yields Bohea.

**Souchong
Tea**

**Black
and
Green
Tea**

All of these different varieties may be made either into black or green tea, though some plants yield leaves better adapted for the manufacture of black tea, and some that serve better for green. Japan tea, for example, is usually made into green, while the Indian are generally black. Chinese tea provides both varieties. The difference between black and green tea is, however, in the method of preparation. Green tea is prepared by withering the leaves in iron vessels over a quick fire, or by steaming them on mats. The leaf is then rolled in order to break up the tissue containing the essential oil. It is then re-heated and subjected to long continued drying over a low fire. In black tea the fresh leaf is spread out to wilt in the sun, then rolled, spread out thinly, moistened and allowed to ferment. The leaves are then dried and fired in a furnace or over a charcoal fire.

**Fermentation
Process**

The chief difference between the black and green tea lies in this fermentation process. By this means, some of the tannic acid in the leaves is changed so that it becomes less soluble. The black tea is thus less astringent than the green. Common varieties of green tea are hyson, corresponding to the pekoe or sou-chong, and gunpowder, corresponding to congou.

Names

Aside from the varieties given by the stage of growth at which the leaf is plucked and by the method of preparation, teas are named from the different countries or the special district that produces them, or even from the gardens where they are grown.

Japan, Chinese, Indian and Ceylon teas each have their own marked characteristics, while the different districts of China give various kinds, as the oolongs from Formosa or the monings from north China.

The quality is dependent on the cultivation of the plant, the age of the leaf, and the care in manufacture. Some of the finest tea of China is so high priced that it can be purchased there only by the very rich, while the lowest grades are often made into bricks (brick tea) and sent into the interior. The choicest Japan tea is raised under protection from direct sunlight and is prepared without rolling. It is said to be untouched with the hand after it is put upon the steaming apparatus. Most of the teas sent to the United States might be classed as low middling, with some superior grades. The choice varieties are rarely received.

Quality

The most important constituents of tea are theine, or caffeine, tannic acid and the volatile oil that gives the flavor. Black and green tea contain practically the same amount of oil and caffeine, but black tea has only about half as much tannic acid as green.

Composition

The method of making tea has an important influence on the constituents of the beverage. Methods vary all the way from one Japanese fashion of stirring the finely ground tea into warm water and drinking the whole infusion, to the Russian method of bringing the water just to a boil and making a delicate infusion.

**Method
of Making**

The boiling of tea and the practice of keeping the

teapot on the stove all day that the brew may be ready at any moment, each results in extracting the largest possible amount of tannic acid from the tea. If tea must stand after making, it should be poured off the leaves immediately. The difference in extract can be easily seen if equal amounts of tea be in one case boiled four or five minutes, in another allowed to stand in cold water, and in a third infused in hot water for the same length of time. If these three results be put into glasses, the depth of color will indicate the difference in material extracted. If a solution of ordinary copperas be made, and a few drops of this added to each, a black, inky substance, a tannate of iron, will form, the amount varying with the tannic acid extracted.

Adulteration of Tea

Adulterations of tea are much less common than formerly. The chief fraud practiced is that of substituting an inferior grade for a better. One method of doing this is by facing the tea. This is practiced especially on green teas, giving them a brighter color.

Occasionally spent or exhausted leaves are mixed with fresh ones, thus constituting an adulteration.

Tea tablets are sometimes prepared for the use of travelers by pressing finely ground tea of varying quality into tablets to be dissolved in hot water.

COFFEE

The coffee tree (*caffaea arabica*) belongs to the same botanical family as the tiny partridge berry found in our northern woods, the familiar button bush of the country roadside, and the gardenia.



COFFEE BEANS AND BLOSSOMS.

It is native to Abyssinia, western Africa, and perhaps western Arabia, though it has now been naturalized in a large number of tropical countries. It blooms eight months in the year and with its small fragrant, white blossoms in the axils of the glossy

Native
Home

evergreen leaves, it presents an attractive appearance. The ripe coffee berry is dark in color and is a pulpy fruit, somewhat resembling a cherry. The berries have two cells, each containing a single seed, the coffee bean. Three gatherings of coffee are generally made annually. The ripe fruit is dried and then freed from skin and pulp, usually by machinery.

In the east a decoction is frequently made of the unroasted seeds, while in some places the leaf of the tree is used for preparing a drink; and it is said that in the Sultan's coffee the dried pulp of the berry is employed.

Roasting

The roasting of coffee so generally practiced, is chiefly for the purpose of developing its flavor and rendering the beans brittle so that they can be more easily ground, though it has other effects also. Coffee is imported from Mocha, Java, Ceylon, Maracaibo, Porto Rico, and other countries. But 75 per cent of that used in this country comes from Brazil. Our Mocha and Java mixtures are simply different kinds of berries from the same plant.

Preparation

Coffee, unlike tea, may properly be prepared either as an infusion or a decoction; that is, it may be extracted without boiling, or it may be boiled.

Constituents

The important constituents of coffee are caffeine and caffetannic acid, and caffeol, the oil that gives the fragrant aroma and flavor. Caffeol is developed by the process of roasting while the amount of caffeine is lessened. Sugar is present in considerable amounts,



PICKING COFFEE BERRIES.

and most of this is caramelized in the roasting. Fat also is found, sometimes to as much as 15 per cent, and proteid to about 10 per cent. A comparison of the composition of tea and coffee is given below :

Percentage Composition of Coffee

	Raw.	Roasted.
Moisture	8.98	0.63
Caffeine	1.08	0.82
Saccharine matter	9.55	0.43
Caffeic acid	8.46	4.74
Alcoholic extract	6.90	14.14
Fat and oil.....	12.60	13.59
Lugumin and albumen.....	9.87	11.23
Dextrin	0.87	1.24
Cellulose and insoluble coloring matter	37.95	48.62
Ash	3.74	4.56

Percentage Composition of Tea

	Unprepared Leaves.	Green Tea.	Black Tea.
Caffeine or theine.....	3.30	3.20	3.30
Ether extract	6.49	5.52	5.82
Hot-water extract	50.97	53.74	47.23
Tannin (as gallotannic acid) ..	12.91	10.64	4.89
Other nitrogen-free extract....	27.86	31.43	35.39
Crude protein	37.33	37.43	38.90
Crude fibre	10.44	10.06	10.07
Ash	4.97	4.92	4.93
Nitrogen	5.97	5.99	6.22

This does not give a fair estimate of the composition of the drinks since we use more coffee to the cup

than tea. Hutchison finds that a cup of black coffee contains nearly the same amount of caffeine and tannin as a cup of tea. This depends, of course, very largely upon the methods of preparation. It is generally considered that with our ordinary methods that less tannin is present in coffee than in tea.

The adulterants of coffee are many. One of the commonest is chicory. In France this is often used in order to add a desired flavor. Other adulterants that have been found are roasted peas, beans, wheat, brown bread, charcoal, red slate, and dried pellets consisting of ground peas, pea hulls and cereals held together with molasses. These are met with only in ground coffee. Although at one time artificial coffee beans were manufactured to some extent, they are said to be seldom found today. The adulteration of unground coffee consists rather of the substitution or admixture of cheap or inferior varieties. A simple rough test for the detection of adulteration in coffee consists in shaking some of the sample in cold water. The pure coffee usually floats on the surface while most of the adulterants sink, the grains of chicory coloring the water a brownish red as they fall. Sometimes adulteration can be detected if ground coffee is spread out upon a paper and examined with a magnifying glass. A better protection is afforded, however, by purchasing the coffee unground.

Adulterants

COCOA

It is said that "the earliest intimation of the introduction of cocoa into England is found in the announcement in the Public Advertiser of Tuesday, 16th June, 1657 (more than a hundred and thirty years after its introduction into Spain), stating that "in Bishopgate street, in Queen's Head alley, at a Frenchman's house, is an excellent West India drink, called chocolate, to be sold, where you may have it ready at any time; and also unmade, at reasonable rates."

Early Use of Cocoa

In spite of this alluring advertisement, it was the beginning of the eighteenth century before chocolate became a fashionable beverage. And even as late as 1832 the consumption of cocoa was very limited, owing to a large duty that existed up to that time. Long before this it had become a great favorite in Spain as it was in Spanish America. In New England a mill for the preparation of chocolate was established in 1765. The chocolate of the early Spanish days must have been somewhat different from the modern article. This is one receipt that is given: "Take a hundred cocoa kernels, two heads of Chili or long peppers, a handful of anise or orjevala, and two of mesachusil or vanille—or, instead, six Alexandria roses, powdered—two drachms of cinnamon, a dozen almonds and as many hazelnuts, a half pound of white sugar, and annotto enough to color it, and you have the king of chocolates."

The cacao tree (*theobroma cacao*) from which chocolate and cocoa are obtained, is a native of tropical America. It grows to an average height of from thirteen to twenty, or even thirty feet, with a diameter of from five to ten inches. A quaint description of the appearance of the tree is given in the following

Cocoa
Tree



FLOWER AND FRUIT OF COCOA TREE.

words: "The cacao-tree almost all the year bears fruit of all ages, which ripens successively, but never grows on the end of little branches, as our fruits in Europe do, but along the trunk and chief boughs, which is not rare in these countries, where several trees do the like. Such an unusual appearance would seem strange in the eyes of Europeans, who have never seen anything of that kind; but, if one examines the matter a little, the philosophical reason of the dis-

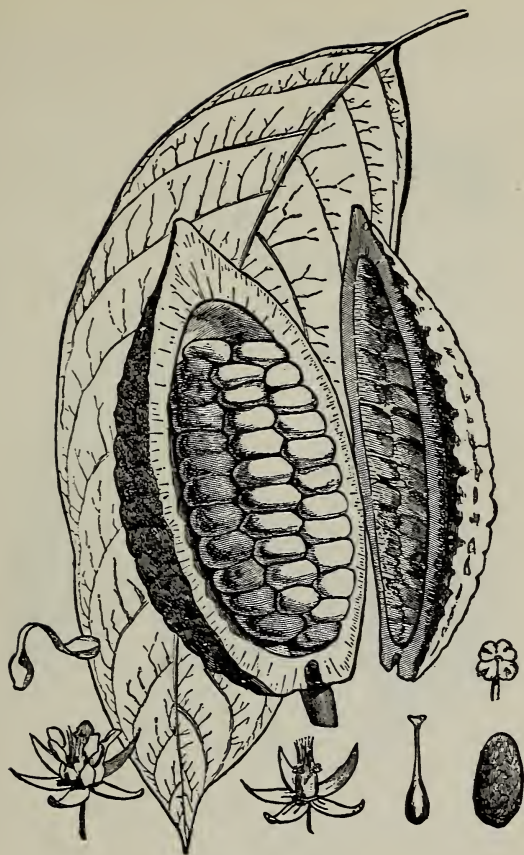
position is very obvious. One may easily apprehend that if nature had placed such bulky fruit at the ends of the branches their great weight must necessarily break them, and the fruit would fall before it came to maturity."

Cocoa is raised from seed, and the tree does not bear fruit till it has reached the fifth or sixth year. It requires an abundance of air and light, but must be shaded from too much direct sun. This is accomplished by growing large shade trees at frequent intervals in the cocoa plantation.

**Cocoa
Bean**

The cocoa beans are the seed of the plant and lie in even rows in a pod not very unlike a large cucumber in shape and size. The first step in the preparation of cocoa is the removal of the bean from this pod and its subjection to a "sweating" or fermentation process. After this the beans are dried in the sun and in this form are shipped to our market.

Beans from different places, Caracas, Trinidad, Maracaibo, Java, and others are imported by the manufacturer who mixes them in different proportions in order to get the result desired. The second step in the process of manufacture is the careful roasting of the beans to develop the flavor, and the crushing or cracking of the nuts and the removal of the thin husk or shell with which the seed is covered, by winnowing. The shells are used in many places for the preparation of a drink. If they are boiled for a long time, a smooth, oily beverage with a pleasant nutty



COCOA BEANS.
Showing Fruit, Flowers and Leaf.

flavor is obtained. The cracked cocoa, or cocoa nibs, as it is called, is also used for preparing a bev-



METHOD OF GROWTH OF COCOA.

erage. A mixture of the shells and nibs gives a very satisfactory result.

The next step in the preparation of chocolate is the

grinding of the nibs and running the semi-liquid product into molds. If sugar or any flavoring is to be added, it is done at this time.

Cocoa in its purest form is chocolate with part of the fat removed. In order that it may stay in a powdered condition, it is necessary either to remove this oil or add some form of starchy material. Sometimes flavoring materials such as cinnamon or vanilla are also added.

Chocolate

Cocoa, like tea and coffee, contains an alkaloid called theobromine. Tannin is also present in the raw bean, but is changed during the roasting to cocoa-red which gives the color to the cocoa. A substance somewhat like the caffeol of coffee is also developed during the roasting process. Cocoa beans also contain a large amount of fat—about 50 per cent—with proteids, starch, and other substances in small amounts.

Theobromine

Percentage Composition of Cocoa

	Roasted Cocoa Nibs.
Water	2.72
Ash	3.32
Theobromine	1.44
Other nitrogenous substances.....	12.12
Crude fibre	2.64
Starch	8.07
Other nitrogen-free substances.....	19.57
Fat	50.12
	<hr/>
	100.00

The food value of clear chocolate has never been questioned. Perhaps the writer of the eighteenth cen-

tury who is responsible for the following statements may have exaggerated somewhat. He says:

"In reality, if one examines the nature of chocolate a little, with respect to the constitution of aged persons, it seems as though the one was made on purpose to remedy the defects of the other, and that it is truly the panacea of old age."

"There lately died at Martinico a counsellor, about a hundred years old, who, for thirty years past, lived on nothing but chocolate and biscuit. He sometimes, indeed, had a little soup at dinner, but never any fish, flesh, or other victuals. He was, nevertheless, so vigorous and nimble that at fourscore and five he could get on horseback without stirrups."

Food
Value

So good a scientist as Liebig says, however: "It is a perfect food, as wholesome as delicious. It is highly nourishing and easily digested, and is fitted to repair wasted strength, preserve health, and prolong life." A simple statement of the case is that we have in chocolate a highly concentrated food, particularly rich in fat, but containing a fair amount of the other food principles. Since it is so concentrated it demands water in abundance. So far as its digestibility is concerned, there is more question. The very presence of so much fat means that it is too rich for some people, while others can digest it with no difficulty. Hutchison tells us that so far as cocoa as a drink is concerned the food value is over-estimated, since the amount we actually use is small. This de-

pende to a large extent upon the manner in which the beverage is prepared. The milk and sugar used add appreciably to the nutriment, and if we follow Thudichum's suggestion, we shall have a beverage of high food value even if one questions its perfection in other respects. He says: "Chocolate should be served in cups and be of sufficient consistency to be eaten with a small spoon, rather than drunk. In this way it was used by the Mexicans; they also ate it with golden spoons. We have tasted the combination, and find chocolate in a red cup and saucer, to be eaten with a golden spoon, aesthetical perfection; both taste and sight are much pleased with the combination."

The possible effect upon digestion of the theobromine present has not been fully determined. It is a substance similar in character to caffeine in coffee and tea. These beverages, however, unlike cocoa, have no food value.

The physiological effect upon the system of tea, coffee, and cocoa has been much discussed. Of the three, cocoa seems to have much less influence either in retarding digestion or as a stimulant, though there is reason to think that it is not without stimulating effects.

Tea has a marked influence in lessening the action of the saliva, while both tea and coffee retard digestion, the latter to a less extent than the former. This effect seems due to the tannic acid and the volatile oil. The caffeine itself favors digestion. Both tea

Physiological
Effect of
Tea, Coffee
and Cocoa

and coffee act as stimulants because of the caffeine present. It is this that causes them to be so effective in lessening the feeling of fatigue. Strong coffee is a powerful antidote to narcotics, and is often used where a heart stimulant is needed. Coffee and tea may, because of the tannic acid and other astringent substances present, prove irritants to the mucous membrane of the stomach. This action is greater if the stomach is empty. The stimulating effect also is greater if taken upon an empty stomach.

**Personal
Equation**

The effects of coffee and tea seem to be influenced largely by the personal equation, and quite opposite results are produced in different persons by them; while in most people they tend to produce wakefulness, in others they are conducive to sleep. Some people can use one freely and must refrain completely from the other.

The general conclusion from experiment and observation seems to be that, taken in moderate quantities and at suitable times, they are not injurious to the healthy adult, but that those of a feeble digestion, or who are nervous, should use them in exceedingly small quantities, if at all. Of the two, coffee seems to have the least harmful effect in the majority of cases.

**Cereal
Coffee**

On the market at present there are a large number of coffee substitutes. Some of them undoubtedly are true cereal drinks, and may be used as such, though when a large amount of food value is attributed to

them on this account, one cannot help wondering how the insoluble substances of the wheat grain can so largely be present in the drink made from the treatment of wheat kernels in water. Some of the so-called cereal coffees are said to derive their flavor from the volatile oils produced in the roasting of coffee, while others actually contain coffee.

ADULTERATION OF FOOD

Pure Food
Campaign

Probably no food question has been so much discussed of late, or has appealed so generally to the public at large as that of food adulteration. Nearly all the states have passed laws providing for more or less stringent regulations, and the United States Congress has passed a national law and is considering further legislation on the same subject. Magazines and newspapers have taken up the matter; the women's clubs have enthusiastically pressed it and a vigorous "pure food" campaign has been made. This is right and proper; but, either through ignorance, or the belief that it is justifiable to do evil that good may come, many statements are made that are not only sensational in the extreme, but absolutely untrue. Others, while not absolutely wrong, convey a distinctly false impression.

False
Impressions

Mrs. Abel, in a recent article, calls attention to some types of such statements by the following illustration:

"A baby has dined on a candy Easter egg and sausage, and the heading reads

DEATH FROM COAL TAR COLOR IN EASTER CANDY.

"Now sausage is not exactly an infant food and might perhaps have been held responsible for the sad result, but sausage is a trite and common thing, while chemical colors, bearing such a disagreeable name will surely catch the public eye!

"And did we not read one other day that a prominent hygienist had announced that 450,000 babies die yearly in this country of poisoned milk? Few of us had access to census reports from which to learn that this is a much larger number than die yearly from all causes under the ages of five, and perhaps fewer still saw the indignant denial of this official, and learned how a truthful and moderate statement can be distorted."

One of our most reputable city dailies is responsible for the following absurd statement in the report of a speech:

"Dr. Wiley, chief of the national bureau of chemistry, says that nine-tenths of the deaths each year in this country are due to dyspepsia, generally caused by impure food. He declares that the tendency also is to shorten the duration of life, and cites figures to show that 2,000,000 deaths in the United States in the last ten years have been traceable largely to the use of bad food. It is the workingman, the poor man, who cannot afford to buy the higher priced articles of food, who suffers more from these conditions.

"Viewed from an economic standpoint also, the laboring man should be interested. In the report of the Kentucky state board of health for last year the statement is made that for every dollar spent in the purchase of food, 45 cents on the average is paid for adulterations."

The implication here is even worse than the actual

Newspaper
Statements

statement, for while "impure food" and "bad food" might include water and milk contaminated with typhoid germs, or food that has been allowed to deteriorate by bacterial action till it is in a dangerous condition, it is evident that the meaning intended to be conveyed is that these phrases mean adulterated food.

The same paper in a recent editorial makes the absolutely ungrounded charge that numerous deaths have been caused by the presence of coal tar dyes in candy. It implies that all manufacturers are actuated by greed, and that they care nothing as to the poisonous character of their materials if only they make money.

Glucose

A circular advertising a certain breakfast food, after dividing glucose into good and bad kinds, introduces the following paragraph, saying that the definition is from the dictionary, "Glucose, the trade name of a syrup obtained as an uncrystallizable residue in the manufacture of glucose proper, and containing in addition to some dextrose or glucose, also maltose, dextrine, etc. It is used as a cheap adulterant of syrups, beers, etc. Thus we learn even in this public way that there are harmless and harmful kinds of glucose."

The implication is, of course, that glucose is unfit for food, and no account is taken of the facts that maltose is a sugar perfectly wholesome and digestible, and that dextrine is always an intermediate product in the change of starch into sugar, whether this change

is induced by the action of acid as in the manufacture of commercial glucose, or by a ferment as in the change of starch into sugar by the saliva.

No good can come from exaggerated and false statements, and it is the business of every woman who has to do with the purchasing of foods to so inform herself that she shall not be misled.

We may classify the adulterants of foods, using the term in a broad sense, under three headings:

First, additions or substitutions used for the sake of cheapening the product; *second*, material such as coloring matter, used either to imitate the natural product or to beautify and make more attractive some foods; *third*, preservatives. Of the first class, by far the greater number are such as affect the pocketbook and not the health. One of the common adulterants of spices, for instance, is starch, and this only means that when such a spice is used a larger amount is needed than would be the case if it were pure. Coffee to which has been added chicory or ground peas or beans, or for which has been substituted an artificial bean, cannot be said to be less wholesome because of this treatment. Cream of tartar, because of its expense, is often adulterated, but again the adulterant is usually harmless. Butterine substituted for butter means the payment on the part of the consumer of a large price for an inexpensive article; but the article consumed is in every way as digestible and wholesome as if no substitution had been made. This and

Classification
of Adulterants

many other articles used to adulterate more expensive ones, have their own value, and if placed upon the market under their own names, might be profitably used. There is no reason to think that corn syrup, or glucose, with a flavoring of caramel is less wholesome than maple syrup, but we all justly object to having the former product labelled with the name of the latter and sold at its price.

Correct
Labelling

The crusade against adulterations should then, so far as this class is concerned, be directed toward full and correct *labelling*, and against the possibility of cheap articles being branded as superior ones or sold at the price of the better article. The consumer should demand the right to receive the full equivalent for money paid, and every effort should be made, not only to have right laws passed but to see that frequent tests are made of food materials bought in the open market, and to compel manufacturers to make a correct statement of the ingredients in their wares.

On the part of the housekeeper there should be a knowledge of materials, and ability to make simple tests, while for such tests as imply technical chemical knowledge material should be sent to the board of health or other experts. Most of all, skill in interpreting labels should be cultivated. A bottle purporting to be vanilla and labelled

PURE VANILLA,

Compound

on the face of it is not vanilla, though it may not necessarily be a less wholesome article.

The second kind of materials that we have classed as adulterants—the coloring matters, are used generally to satisfy a popular demand. Everyone knows that fresh butter is seldom of the bright yellow color of that on the market, yet few people would purchase an uncolored butter. Because in June, under the best conditions, butter is yellow, we have come to regard that as the only desirable thing. The manufacturer of a certain brand of cheese a few years ago made an attempt to put an uncolored product on the market, though he had formerly used coloring. To his surprise, he could not sell his cheese. The public, accustomed to a deep orange color in that brand, said the white cheese was not “so rich,” that it was made of skim milk instead of cream, and refused to accept it.

As soon as the purchasing public has a different standard of values the manufacturer will cease to color his products. He will be content to offer properly canned tomatoes, even though the color is not as brilliant as that of the fresh fruit, and will put upon the market a catsup more attractive though less bright than the modern product. He will devise methods of canning peas and beans that will change their color as little as possible, but will not “green” them to deceive a credulous public. At the same time, the dishonest manufacturer will have less opportunity to conceal the inferiority of poor goods by the addition of color.

Coloring
Matter

**Coal Tar
Dyes**

Color is also used frankly to beautify articles, as in the case of candy, and this seems legitimate when the colors are harmless, and the coloring is delicate. In this case, as in that of other uses of it, the question arises as to the possible harmful effects of the colors used. Of late the so-called coal tar dyes have been frequently employed, and perhaps because of their name much anethema has been directed against them. As a matter of fact, most of the coal tar dyes used are perfectly harmless, with absolutely no physiological effect. They are so strong in coloring power that a very minute amount is all that is necessary to give the desired result. Some of the coal tar dyes are poisonous, and should not be used, though again the fact that so small an amount is required to produce the effect is a protection. Some vegetable dyes are also poison, as well as some of the mineral dyes used before the coal tar products were available, and both of these classes have less coloring power, and so must be used in larger quantities.

That the confectioners are not all "monsters of greed" "reeking" with the desire to make money at the cost of the health and lives of an unsuspecting public, is shown by the fact that long lists of harmless and harmful colors have been made by the National Confectioners' Association, and that the same association has offered resolutions for dealers in confectioners' colors as well for manufacturers of candies, urging only the legitimate use of non-poisonous col-

ors. Legislation and public opinion should unite in forbidding the use of any harmful coloring even in minute quantities, and careful investigation should be made and lists of safe colors presented. An educated public will see no beauty in crude and vivid colors and will demand only the most delicate shades in candies and similar products, and this will mean less coloring of any kind.

As to the use of preservatives in food, there is an honest difference of opinion among experts. It is contended by many that in proper amounts and under proper regulation they are a desirable safe-guard, since they keep in a fresh and wholesome condition foods that would otherwise deteriorate. The amounts necessary are so small that they would seem presumably to have no effect on the users. On the other hand, the user may not be a healthy adult, but an infant or an invalid, presenting quite a different problem. In most cases a little more care would keep the food in proper condition without the resort to doubtful means.

Preservatives

The two sides of the case are stated as follows in the government pamphlet giving the result of the famous borax experiment.

"It is admitted by all who have examined the subject in a critical way, even by the users of preservatives, that in certain maximum quantities the limit of toleration is reached in each individual and positive injury is done. But it is also well recognized that

**Government
Statement**

many, if not all, of the usual foods when used in large excess produce injurious results. The many cases of disease produced by overeating, or by eating improperly prepared or poorly cooked foods, or by eating at unusual times, are illustrations of this fact. Upon this basis and upon the further statement that when used in extremely small quantities the preservatives in question cannot be regarded as harmful, is founded the principal argument in favor of the use of the preservatives, aside from the fact that the foods themselves are kept in a better and more wholesome state."

**Small
Quantities**

"It would be useless to contend that the occasional consumption of small quantities of boric acid in a sausage, in butter, or in preserved meat would produce, even upon delicate stomachs, any continuing deleterious effect which could be detected by any of the means at our disposal, but naturally it seems that this admission does not in any way justify the indiscriminate use of this preservative in food products, implying, as it would, the equal right of all other preservatives of a like character to exist in food products without restriction.

"It appears, therefore, that there is no convincing force in the argument for the use of small quantities unless it can be established that there is only a single preservative used in foods, that this preservative is used in only a few foods, that it will be consumed in extremely minute quantities, and that the foods in

which it is found are consumed at irregular intervals and in small quantities. On the other hand, the logical conclusion which seems to follow from the data at our disposal is that boric acid and equivalent amounts of borax in certain quantities should be restricted to those cases where the necessity therefor is clearly manifest, and where it is demonstrable that other methods of food preservation are not applicable and that without the use of such a preservative the deleterious effects produced by the foods themselves, by reason of decomposition, would be far greater than could possibly come from the use of the preservative in minimum quantities. In these cases it would also follow, apparently, as a matter of public information and especially for the protection of the young, the sick, and the debilitated, that each article of food should be plainly labeled and branded in regard to the character and quantity of the preservative employed."

Conclusion

Many more experiments need to be conducted before we know the truth in the matter of preservatives. Meanwhile most careful supervision of their use should be exercised when they are allowed at all, and every effort should be directed toward securing cleanly processes of food preparation, and such good conditions that no preservatives should be needed other than the ordinary ones of salt, sugar, spices, with the processes of smoking and sterilization.

**More
Experiments
Needed**

The most common preservatives in general use are

formaldehyde, salicylic acid, benzoic acid, baking soda, borax and boric acid.

**Home
Tests**

Some of the simpler tests for food adulterants can be successfully used by the housekeeper even without technical training.

The following methods of distinguishing between butter, oleomargarine and renovated butter are taken from the farmers' bulletin on the subject:

The Spoon Test for Butter

In the kitchen the test may be conducted as follows: Using as the source of heat an ordinary kerosene lamp, turned low and with chimney off, melt the sample to be tested (a piece the size of a small chestnut) in an ordinary tablespoon, hastening the process with a splinter of wood (for example, a match). Then, increasing the heat, bring to as brisk a boil as possible, and after the boiling has begun, stir the contents of the spoon *thoroughly*, not neglecting the outer edges, two or three times at intervals during the boiling—always shortly before the boiling ceases. In the laboratory a test tube, a spoon, or sometimes a small tin dish, is used in making this test. From the last-named utensils the test is often called the "spoon test," and sometimes the "pan test."

A gas flame, if available, can be used perhaps more conveniently than a kerosene lamp. —

Oleomargarine and renovated butter boil noisily, sputtering (more or less) like a mixture of grease and water when boiled, and produce no foam, or but

very little. Renovated butter produces usually a very small amount.

Genuine butter boils usually with less noise, and *produces an abundance of foam.*

To Distinguish Oleomargarine from Genuine and Renovated Butter

Utensils Required.—The utensils required in the test to distinguish oleomargarine from renovated and genuine butters are as follows:

(1) A one-half pint tin “measuring cup,” common in kitchen use, marked at the half and quarters; or a plain one-half pint tin measure, ordinary narrow form; or an ordinary small tin cup, $2\frac{3}{4}$ inches in diameter and 2 inches in height, holding about one gill and a half.

(2). A common kitchen pan, about $9\frac{1}{2}$ inches in diameter at the base.

(3). A small rod of wood, of the thickness of a match and of convenient length for stirring.

(4). A clock or watch.

The Process.—The process for distinguishing oleomargarine from renovated and genuine butters is as follows:

Use sweet skimmed milk, obtained by setting fresh milk in a cool place for twelve to twenty-four hours and removing cream as fully as possible. Half fill with this milk the half-pint cup or measure, or two-thirds fill the smaller cup mentioned, measuring accu-

rately the gill of milk when possible ; heat nearly to boiling, add a slightly rounded teaspoonful of the butter or butter substitute, stir with the wooden rod, and continue heating until the milk "boils up," remove at once from the heat and place in the pan (arranged while milk and fat are heating), containing pieces of ice with a very little ice water, the ice to be mostly in pieces of the size of one to two hens' eggs (not smaller, as small fragments melt too rapidly) and sufficient in quantity to cover two-thirds of the bottom of the pan; the water to be in quantity sufficient, when the cup is first placed in the pan, to reach on the outside of the cup to only one-fourth the height of the milk within; any water in excess of that amount must be removed. (This refers to the condition at the beginning of the cooling; later, as the ice melts, the water will rise to a higher level.) Stir the contents of the cup rather rapidly, with a rotary and a cross-wise motion in turn, continuously throughout the test, except during the moment of time required for each stirring of the ice and water in the pan, which must be done thoroughly once every minute by the clock. This is done by moving the cup about, in a circle, following the edge of the pan. Proceed in this manner for ten minutes, unless before that time the fat has gathered or has allowed itself to be easily gathered in a lump or a soft mass, soon hardening. If it so gathers, the sample is oleomargarine; if not, it is either genuine or renovated butter."

It will be seen that by trying both of these tests one may determine which of the three a suspected sample of butter really is.

A method of determining the presence of coal tar dyes in foods has been given in the following words by a recent writer :

"Suppose that some cheap currant jelly is to be examined. Stir up about one-fourth of the contents of the tumbler of jelly with about a pint of water in an agate stewpan. Take a piece of white woolen cloth about five or six inches square and wet it thoroughly with boiling water. Care should be taken that it is "all wool," and white is better than cream color. Nun's veiling is an excellent thing to use. Immerse the cloth in the diluted jelly and boil it on the stove for five or ten minutes, stirring it frequently with a small wooden stick. Then remove it and wash well in boiling water. If a dye has been used in the jelly the cloth will be brightly colored.

**Test for
Aniline
Colors**

"Natural colors impart to the wool, when treated in this way, only a dull pinkish-brown color, quite different from the brilliant color of the artificial dye. In order to be absolutely certain, however, it is best to take the dyed wool and boil it with about a tablespoonful of ordinary household ammonia in half a pint of water. After boiling for five minutes, remove the wool, and if the ammonia is colored add to it a third of a cupful of vinegar, immerse it in a second piece of the white woolen cloth and boil it as before. Any color that is imparted to the second piece of

cloth is the analine dye, which was dissolved off by the ammonia. The natural color would not be removed from the first cloth by the ammonia, hence would not dye on the second piece. The coloring can be boiled out of sausages and dyed on wool in the same way."

**Gelatine
Test**

"Another interesting way of showing the presence of these dyes, especially in beverages, is to dye them on gelatine. Dissolve one part of gelatine in ten parts of boiling water and pour it into a deep pan to harden. When it is cold, by means of a sharp knife cut it into inch cubes. Place one of these cubes into the suspected liquid and allow it to remain for twenty-four hours, then wash it slightly with cold water and cut through it with a knife. If the color is a natural one it will lightly tinge the outer surface of the cube, but will not penetrate far below the surface, so that the inner portions will be largely free from color. Nearly all of the coal-tar dyes, cochineal and similar colors, will be found to permeate the jelly cube, often to the center.

"One advantage of the dyeing on cloth, however, is that the sample can be preserved as evidence. Nothing is better than ocular proof to convince the average person."

Several other tests for food adulteration have been given under the special foods or in other papers of this series. (See also Bulletin No. 100. *Some Forms of Food Adulteration and Simple Methods for Their Detection*. Price 10 cents, of the Supt. of Documents, Washington, D. C.)

SPECIAL DIET

The housekeeper of today must know not only how to select food for the normal member of her household, and how to provide for the varying needs of different ages and activity, but she is many times called upon to direct the diet of an invalid or a delicate child or to provide special foods for those who are sick.

It is not her province to diagnose a case, or to prescribe special diet, but it is her part to be able intelligently to carry out the directions of a physician. If the invalid is to have starchy foods eliminated from his menu, the housekeeper must know where to turn to obtain foods that will furnish the requisite number of calories without recourse to carbohydrates, and she must be able to prepare such food in a palatable manner; if the diet is to contain a large amount of fat, as in the case of a tubercular patient, she must know where to obtain this food in a digestible form, and, if there is need for economy, how to substitute cheap forms of fat for the more expensive ones. She must know, when the direction is given for a nourishing diet, how to add the egg or milk that is required, or to substitute some other form of food if these are not acceptable.

The housekeeper then, so far as invalid diet is concerned, should be familiar first, with the composition of the ordinary food materials, and second, with the relative digestibility of the different foods so far as

Housekeeper's
Province

that knowledge is available and with their physiological effect. Then, and then only, can she intelligently carry out the directions given.

**Food for
Children**

One of the troublesome problems for the mother is the deciding upon the right food for children, especially for those of school age. While the physician will direct her in the care of her invalids, and in the food necessary for the young baby, she is usually left to work out her own problems so far as the older child is concerned. One reason for this is that comparatively little attention has been given to this matter, while the diet for the baby has been studied for years.

Fortunately the healthy child settles the matter for himself to quite an extent and his own normal appetite guides him up to a certain point. But a normal appetite may easily become perverted, and lead him far astray.

**High
Proteid**

As we have seen, the child needs a larger percentage of proteid in the diet than the adult. At about ten or twelve years the needs of the body rapidly increase, and a far larger amount of food in proportion to body weight is used than in the case of the adult. The mother who has a growing boy of this age is often astonished at the amount of food he eats and seems to need. The chart given on page 51 shows the proportional amounts of the different foods needed at different ages.

Little anxiety need be felt lest the child overeat if the food be *properly masticated* and so taken slowly,

if it be of the right kind, and if it be taken at proper times. The latter point is particularly important in its relation to sweets. Candy at the end of a meal for dessert is legitimate and even desirable, but the same article bought at the candy store and eaten on the way home from school before dinner is seriously objectionable, since it satisfies the appetite and lessens the desire for the regular meal without giving adequate nourishment. An over amount of sugar may easily be taken in this way while rarely, if ever, does this happen if the appetite is first largely satisfied with bread and milk, vegetables and meat.

The often objectionable children's party would be robbed of its evil effects if simple, attractive sandwiches were always provided in abundance before the ice cream and cake were offered, since few children would over-eat of the latter under these circumstances.

If children are to be allowed to eat freely the food must be simple in character and easy of digestion. The ordinary meats, with the exclusion of pork, cooked simply, few "made" dishes, an abundance of vegetables and fruits, only the simplest puddings, no pastry, occasional plain cake (not between meals), plenty of the best of bread and butter, of well cooked cereals and of milk and eggs will furnish variety sufficient for anyone. Tea and coffee are to be reserved for the adult, while cocoa may be used in moderation, chiefly for the milk with which it is made. Highly seasoned foods are to be avoided, as they tend

Children's
Parties

to excite unduly the flow of the digestive juices and gradually make such flow dependent on their stimulation. Their continued use also seems to induce a craving for strong stimulants.

Fat in
the Child's
Diet

It is necessary to encourage many children to eat more fat than they are inclined to do. This may as legitimately be taken in the form of butter and cream as in that of fat meat, so generally repungant to children. Hutchison suggests that toffee taken at the end of the meal is a good medium for fat when there is difficulty in giving sufficient in other ways.

With young children special attention must be paid to the digestibility of the food. This is frequently a matter of personal idiosyncrasy, and when this is the case the matter can only be determined by experiment. The safe way is to begin the diet with foods which are generally easily digested, and to allow those more difficult of digestion only at a later period. If any one article proves unwholesome in the particular case, it should of course be discarded.

Omnivorous
Tastes

On the other hand, it is most undesirable that children should grow up without learning to like all ordinary foods, and without being able to eat every kind of wholesome food. Such habit cannot be acquired unless a certain variety is provided and unless the child who is old enough be encouraged to try different articles. Even those less easily digestible may at a proper age be taken occasionally with impunity, for the sake of accomplishing this end. Vegetables,

while so desirable in the diet, often seem to be an acquired taste.

Above all things there should be no yielding to a child's whims in allowing him to refuse the food offered and to require special provision for himself.

The question of eating between meals is one that frequently arises. During the school period there is difficulty in providing food at sufficiently short intervals. The child who has breakfasted early, often becomes exhausted before the time of the noon meal. This exhaustion sometimes is shown by the apparent stupidity or the inattention and restlessness of the child, and sometimes by extreme irritability. Wherever this interval is a long one, there should be provision for some luncheon during the morning. School lunches have been established in many places and when well conducted serve an excellent purpose. Where the establishment of such a luncheon is not possible, a light lunch carried from home, such as a sandwich, a slice of bread and butter sprinkled with sugar, or even some fruit or sweet chocolate, eaten in the middle of the morning, will do much to preserve the good temper of the child and to make it possible for him to do his work adequately. The child who at home grows hungry between meals should be allowed to have something to eat, provided it be bread and butter, a sandwich, or crackers and milk, or fruit. With the younger children the heartiest meal should be in the middle of the day, and the evening meal

Eating
Between
Meals

should be chosen with especial reference to ease in digestion.

In general, then, the food for children should differ from that of adults, first, in being of the most simple character; second, in the absence of stimulating substances, such as large amounts of spice; third, in the proportions of the different food principles. In addition to this the child should think as little as possible about the food he eats. The constant discussion of the wholesomeness of different articles of diet and the consequent directing of the attention of the child to his own bodily processes seems distinctly harmful. Such discussion should only be used when necessary in order to show the unsuitableness of some especially desired food that must be denied. Good habits in regard to food should be established at this age, rather than theories about it.

Students'
Diet

Much has been said in regard to food for older students, and a number of studies of student diet have been made. A few points only can be considered. In the first place, the student is leading a sedentary life, and does not need the hearty food required by the laborer or the one who is doing much outdoor or manual work. The proportion of proteid should be somewhat high in comparison with that of the carbohydrates, and the food should be simple and digestible, in order that but little energy be used in carrying on the processes of digestion.

A good variety is needed, however, and especial care must be exercised to make the food attractive that the appetite may be stimulated. The comparatively small amount of exercise taken generally by the student makes this especially necessary, though no amount of attention paid to the food can or should be a substitute for the healthy appetite.

As in the case of the child, it is frequently wise for the student to eat oftener than at the regular meal time. A glass of milk, a cup of cocoa, or of broth with a cracker in the middle of the morning will often prevent a headache from exhaustion.

Old age needs especial consideration in regard to diet as well as youth. After middle life the total amount of food needed lessens somewhat, and the proportion of building material, both of proteids and of mineral salts is less. Again, as in childhood, care must be exercised in regard to digestibility and simplicity of food. Often special conditions of the system must be considered and certain kinds of food avoided, but this is a matter for intelligent following of a physician's directions.

Old Age
Diet

One of the question that frequently arises in regard to diet is that of reducing or increasing flesh by this means. Increase in weight implies that more food is taken into the body than is utilized in the repair of waste and in work. To prevent the storage of fat more work must be performed or less food taken. The well known systems for curing obesity depend chiefly on the reduction of the total amount of food,—some-

times to two-fifths of the standard dietary, and on the lessening of the proportion of fats and carbohydrates, especially of the latter. So radical a treatment as this should only be undertaken under the direction of a physician as there is a possibility of serious injury to health. A diminution of the sugar and starch in the diet and a slight lessening of the total amount eaten with increased light exercise may be undertaken by almost anyone with the result of decreasing the fat of the body.

The converse of course holds true. Rest, a full diet, and one rich in carbohydrate and fat tend to increase the storing of fat in the body, although there is occasionally a person who fails to respond to such treatment. In increasing the diet due regard must be paid to the digestive powers of the individual that they may not be over-taxed.

It is said that some oriental countries, wiser than we, have a custom of paying the physician for keeping the family well, not for restoring the sick member to health. In the absence of such a custom and with physicians not trained for this purpose, the housemother herself must perform this office.

Special diet in disease must be directed by the physician, for the housekeeper, even though she informs herself upon the general principles of such diet, cannot recognize special symptoms that often require individual modification of general rules. She must content herself, then, with the role of preserver of health, and though she can by no means ward off all sickness by the best planned dietary, she can do much toward strengthening the constitution of the members of her family, and making their bodies more resistant to disease.

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Note.—Books may be ordered through the School at the prices given. Any book for which the postage is given may be *borrowed* by members of the School for one week. Send the postage in stamps with the request.

U. S. DEPARTMENT OF AGRICULTURAL PUBLICATIONS

Farmers' Bulletins.

- Free, of the Department of Agriculture, Washington, D. C.
- No. 34—Meats, Composition and Cooking.
- No. 42—Facts About Milk.
- No. 63—Care of Milk on the Farm.
- No. 74—Milk as Food.
- No. 85—Fish as Food.
- No. 93—Sugar as Food.
- No. 112—Bread and the Principles of Bread Making.
- No. 121—Beans, Peas and other Legumes as Food.
- No. 128—Eggs and their Uses as Food.
- No. 129—Sweet Potatoes.
- No. 142—Principles of Nutrition and the Nutritive Value of Food.

No. 175—Home Manufacture and Use of Unfermented Grape Juice.

No. 182—Poultry as Food.

No. 183—Meat on the Farm: Butchering, Curing, and Keeping.

No. 203—Canned Fruit, Preserves and Jellies.

Reprint from Year Book of 1900—The Value of Potatoes as Food.

Reprint from Year Book of 1902—The Cost of Food as Related to Its Nutritive Value.

Circular No. 43—Foods, Nutrients, Food Economy.

Circular No. 46—The Functions and Uses of Food.

Also, see the List of Bulletins and Circulars of U. S. Department of Agriculture for Free Distribution, for contents of the Farmers' Bulletins called "Experimental Work," which have many brief articles of interest, compiled chiefly from State Agricultural Station reports.

STATE AGRICULTURAL EXPERIMENT STATION BULLETINS.

Free, within their own states, usually sent to others free or for a two cent stamp. Apply to the various stations.

Maine Agricultural Experiment Station, Orono, Maine.

Bulletin No. 54—Nuts as Food.

Bulletin No. 65—Coffee Substitutes.

Bulletin No. 84—Cereal Breakfast Foods.

Bulletin No. 118—Cereal Foods.

Illinois Agricultural Experiment Station, Urbana, Ill.

Circular No. 71—Roasting of Beef.

Cornell Agricultural Experiment Station, Ithaca, N. Y.

Bulletin No. 230—The Cooking Quality of Potatoes.

Minnesota Agricultural Experiment Station, St. Paul, Minn.

Bulletin No. 74—Digestibility of Beans.

Bulletin No. 92—Digestibility of Cabbage, Cheese, Rice, Peas and Beans.

Note.—There are many other State bulletins but their results are usually republished in the bulletins of the Office of Experiment Stations.

FOR SALE BULLETINS OF THE OFFICE OF EXPERIMENT STATIONS.

Send coin or money order (stamps not accepted) to the Superintendent of Documents, Washington, D. C.

No. 28—The Chemical Composition of American Food Materials. By W. O. Atwater. Price 5 cents.

No. 29—Dietary Studies at the University of Tennessee in 1895. By Chas. E. Wait, Ph. D. Price 5 cents.

No. 35—Food and Nutrition Investigations in New Jersey. By Edward B. Voorhees. Price 5 cents.

No. 40—Dietary Studies in New Mexico. By Arthur Goss, M. S. Price 5 cents.

No. 43—Losses in Boiling Vegetables and the Composition and Digestibility of Potatoes and Eggs. By H. Snyder, B. S. Price 5 cents.

No. 52—Nutrition Investigations in Pittsburg, Pa. By Isabel Bevier, Ph. M. Price 5 cents.

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No. 55—Dietary Studies in Chicago. Jane Addams and Caroline L. Hunt. Reported by W. O. Atwater. Price 5 cents.

No. 63—Description of a New Respiration Calorimeter and Experiments on the Conversion of Energy in the Human Body. By W. O. Atwater, Ph. D. Price 10 cents.

No. 84—Nutrition Investigations at the California Agricultural Experiment Station. By M. E. Jaffa, M. S. Price 5 cents.

No. 85—A Report of Investigations on the Digestibility and Nutritive Value of Bread. By Chas. D. Woods. Price 5 cents.

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No. 132—Further Investigations Among Fruitarians at the California Agricultural Experiment Station. By M. E. Jaffa, M. S. Price 5 cents.

No. 141—Experiments on Losses in Cooking Meat, 1900-1903. By H. S. Grindley, D. Sc. Price 5 cents.

No. 143—Studies on the Digestibility and Nutritive Value of Bread at the Maine Agricultural Experiment Station, 1899-1903. By C. D. Woods. Price 5 cents.

No. 149—Studies of the Food of Maine Lumbermen. By C. D. Woods. Price 10 cents.

No. 152—Dietary Studies with Harvard University Students. By Edward Mallinckrodt, Jr. Price 5 cents.

No. 156—Studies of the Digestibility and Nutritive Value of Bread and of Macaroni at the University of Minnesota. By Harry Snyder, B. S. Price 10 cents.

No. 162—Studies on the Influence of Cooking upon the Nutritive Value of Meats at the University of Illinois, 1903-1904. By H. S. Grindley, Sc. D. Price 15 cents.

PURE FOOD

Circular No. 16—Officials charged with the Enforcement of Food Laws in the United States and Canada.

Circular No. 17—Standards of Purity for Food Products.

Circular No. 59—Influence of Formaldehyde on the Digestive Enzymes.

Extract No. 44—Butter Substitutes.

Extract No. 221—The Use and Abuse of Food Preservatives.

Extract No. 328—Determination of the Effect of Preservatives on Food and Health.

Extract No. 331—The Adulteration of Drugs.

Farmers' Bulletin, No. 131—Household Tests for the Detection of Oleomargarine and Renovated Butter.

Bulletin No. 13—(Bureau of Chemistry). Part 9, Cereals and Cereal Products. Price 5 cents.

Bulletin No. 13—(Bureau of Chemistry). Part 10, Preserved Meats. Price 10 cents.

Bulletin No. 84—(Bureau of Chemistry). Influence of Food Preservatives on Health, Part I Boric Acid and Borax. Price 30 cents.

Bulletin No. 69—(Bureau of Chemistry). Food and Food Control. (Revised). Parts I, II, III, IV, V, VI, VII, VIII. Price 5 cents each.

National laws to 1905 in Part I and laws of all the States in alphabetical order. Request State laws wanted.

Bulletin No. 100—(Bureau of Chemistry). Some Forms of Food Adulteration and Simple Methods for their Detection. Price 10 cents.

Bulletin No. 46—(Bureau of Animal Industry). The Milk Supply of 200 Cities and Towns. Price 15 cents.

Bulletin No. 70—(Bureau of Animal Industry). Milk Supply of 29 Southern Cities. Price 5 cents.

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PERIODICALS AND LISTS.

Experiment Station Record, published by U. S. Department of Agriculture, Office of Experiment Stations. Price \$1.00. Published monthly and contains extracts and summaries of national and state publications, foreign and domestic magazines, and current books relating to food and the work of the various departments.

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TEST QUESTIONS

FOOD AND DIETETICS

PART III

Read Carefully. It will be advisable to read the following United States Department of Agriculture Bulletins in connection with this lesson: No. 121—Beans, Peas, and Other Legumes as Food. No. 129—Sweet Potatoes. Reprint—The Value of Potatoes as Food. Circular No. 17—Standards of Purity for Food Products. Circular No. 16—Officials Charged with the Enforcement of Food Laws. Extract No. 221—Use and Abuse of Food Preservatives. *Make your answers full and complete.*

1. In what different ways may vegetables be classified? Classify the following according to each method: Tomatoes, potatoes, sweet potatoes, squash, turnips, beets, green corn, lettuce, spinach, cabbage, green peas, dried peas, string beans, dried lima beans, celery, rice.
2. How does the percentage of water in milk compare with that in vegetables and fruits?
3. How does the presence of cellulose in vegetables affect our use of them?
4. Why do vegetables have an important place in the diet?
5. Compare fruits and nuts as to food value.
6. Name three fruits that have a high food value.
7. Compare tea, coffee and cocoa as beverages.
8. Describe the process of the preparation of tea for the market, and account for the names of different kinds.
9. What are the reasons for prohibiting the adulteration of foods?
10. (a) How ought this to be accomplished? (b) What do you know of the food laws in your own state?

FOOD AND DIETETICS

11. Give examples, from your own experience if possible, of misleading statements in regard to food, and show the truth in the matter.
12. Can you suggest any way in which standards may be changed so that the public will not demand such articles as colored butter?
13. Give the arguments for and against the use of preservatives. Which side seems to you to have the better case?
14. Try the two tests for distinguishing butter, butterine, and renovated butter, and report your results.
15. How should the diet of a child, say from five to ten years of age, differ from that of the adult?
16. What is the objection to the use by the child of tea, coffee and highly seasoned food?
17. What control should be exercised over eating between meals on the part of the child?
18. What is the need for fat in the child's diet? In what ways may it be supplied?
19. Make out a menu for three days for a child of about eight.
20. What is the province of the housekeeper in regard to food for the sick?
21. Summarize the chief new points that you have learned from *Food and Dietetics*.
22. To what extent and how has the study of these lessons resulted in the modification of your own diet or that of your family?
23. What questions have you?

Note.—After completing the test, sign your full name.

Principles *of* Cookery

PART I

LESSON PAPER

PREPARED BY

ANNA BARROWS

DIRECTOR CHAUTAUQUA SCHOOL OF COOKERY

LECTURER SIMMONS COLLEGE

1904

American School of Household Economics

CHICAGO, ILLINOIS, U. S. A.

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AMERICAN SCHOOL OF HOUSEHOLD ECONOMICS

PRINCIPLES OF COOKERY

A NATURAL starting point in the art of cookery is the fire, since cookery without heat is an impossibility. Human beings everywhere use fire to prepare their foods and by such applications of heat man first showed his superiority to the beasts.

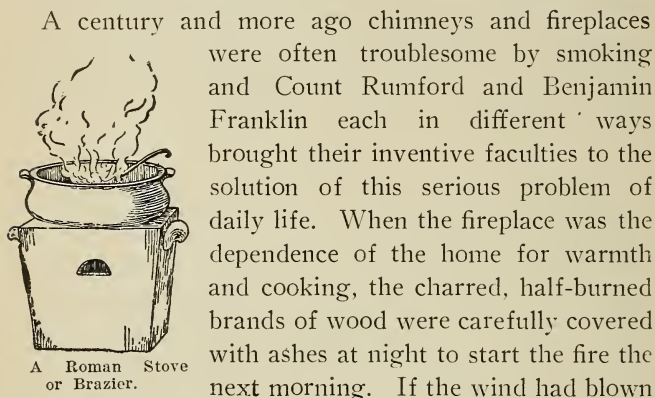
FIRE

Among the ancients fire was regarded as a gift from the gods, to be protected in every way, and all civilization, forms of religion, civil ordinances, and family life have been traced to the care primitive man bestowed upon his fire. Among the early tribes, the chieftain was often the only one to have a fire in his home. The hearthstone thus became the center of the home life, the abode of the household gods, and even at the present time it is impossible for some persons to separate the spirit of the home from the kitchen fire.

In different sections of the country may still be seen all the types of fire and stove that have been developed through centuries, and every housekeeper should be familiar with the principles underlying the care of each. Among these are the camp fire where food is broiled over coals or buried in hot ashes, the charcoal brazier of the fruit vender, essentially the same as the portable stoves found in Pompeii, the open fireplace, the brick oven, the Franklin stove, (an in-

Ancient
Stoves

vention of Benjamin Franklin), cookstoves adapted to wood, to hard and soft coal, to kerosene, to gas, and the electrical appliances which as yet are little more than toys for the rich.

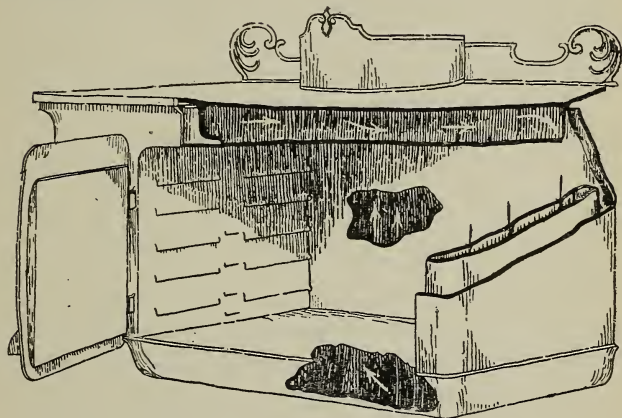


A century and more ago chimneys and fireplaces were often troublesome by smoking and Count Rumford and Benjamin Franklin each in different ways brought their inventive faculties to the solution of this serious problem of daily life. When the fireplace was the dependence of the home for warmth and cooking, the charred, half-burned brands of wood were carefully covered with ashes at night to start the fire the next morning. If the wind had blown off the ashes and the coals were gone out, it was easier to borrow more coals from a neighbor than to use the flint to produce a spark. All this was changed when matches were invented.

First
Ovens

It was but a step for primitive man from baking in hot ashes or in a covered kettle set on the coals to a simple form of oven. Often one oven served a community. Brick ovens were built at one side of the chimney. Sometimes the heat was turned through a flue to heat these ovens, sometimes a fire was built directly in the oven, and when it was burned down the oven was swept out and the food put in to be cooked

by the heated bricks. The later brick ovens, still used in some old houses, often had space underneath for a separate fire.



An Oven, Showing Direction of the Hot Gases.

For the open fire, wood is the most satisfactory fuel but it is not desirable for continuous use in cooking or heating. Wood is sold by measure, which is an inaccurate method at best. The drier the wood the better it burns, and a hard wood which produces coals is most useful.

Wood
as Fuel

When wood is heated and the volatile portions expelled, charcoal is produced. This is usually sold by measure. Its weight is about one-fifth that of the wood from which it is made. It is a primitive form of fuel and generally used in warm countries. A succession of small fires which can be quickly lighted and as

quickly extinguished are more suitable to such conditions than the one large stove or range.

The small stoves used today by the Latin races and their colonies do not differ materially from those of the early Romans.

Charcoal

The charcoal broiler is used by many hotels because of the flavor it appears to develop in meats.

Peat is an important fuel in some sections of the world. It must be thoroughly drained or dried, and at best contains a large percentage of ash.

Both anthracite and bituminous coal have been in common use for less than a hundred years.

Hard Coal

A dense solid, like hard coal, kindles slowly but requires far less care to maintain a fire than wood. Coal is a better fuel for winter than summer. If the lumps of coal are too large they will not kindle readily; if too small, they choke the flame. The large nut and egg grades are best suited to cooking purposes. The draft and size of the fire box determine the size and grade to be used for good results. The free burning "Franklin" coal should be used with poor draft, while with a good draft and large fire box all grades and the larger sizes may be used. A dark brilliant coal will have fewest clinkers. The intense heat resulting from open drafts fuses in large masses the foreign matter which is mixed with the carbon. By burning oyster shells in such cases, new compounds are formed which prevent the clinkers, but the clinkers seldom form with a moderate supply of air.

Soft coal needs very different treatment from hard. Little draft underneath is required, but some draft is necessary over the top to burn the gases given off, and the funnel draft must be open to allow the smoke to escape. If the coal has "coked" over on top it must be broken up when good fire is required. If the fire is to be kept, it is allowed to coke over.

Soft Coal

Briquettes are made from coal dust and other substances and are used extensively in places where coal is high priced.

The wood and coal stoves and ranges are today the most common means of cooking foods. Housekeepers often become familiar with one stove and one kind of fuel and are unsuccessful with another because they are unwilling to study the laws of nature, or lack the patience to experiment with a new adaptation of them.

Stoves
and
Ranges

Much besides personal preference must be considered in the proper valuation of fuels; not only the percentage of carbon, moisture, and volatile matter in each, but the necessary waste, the by-products, and the time required for caring for each and keeping the surroundings clean.

The best stoves and ranges are those plain in finish and simple in construction, with parts well fitted together so that they can be taken apart if necessary and easily cleaned.

A portable range is one that may be moved if necessary, while the "set" range is built into the chimney.

The fire box is lined on the sides with a kind of brick

Fire-Box

above which the fire should never come. The revolving grate is the most common in recent styles of stoves. There is a grate underneath, and below is a place for ashes or a pan which may be taken out to empty. The oven is surrounded by spaces through which hot gases circulate.

The housekeeper should investigate her stove thoroughly when the fire is out, take off all covers, open doors, remove the "clean out" plate for the space under the oven; then see how the dampers work and explore all passages with a lighted match or candle if need be.

The Draft

The draft given by the chimney depends upon the difference in temperature between the air of the room and the gases of combustion. The hot gases are more expanded and therefore lighter and tend to rise. The hotter the fire the greater the draft will be.

The supply of air is as essential as fuel for a good fire; combustion depends upon both. Smoke and an accumulation of soot are indications of incomplete combustion.

Several drafts and dampers are common to all wood and coal stoves and ranges. They should be open to start the fire, but closed to keep it. The slide under the fire box supplies the fresh air necessary for perfect combustion. A check in the pipe or at the back of the stove under the pipe, or in both places, is usually known as the chimney damper. A slide in the stove pipe or connected with the chimney damper admits cold air into the stove pipe when opened and thus lessens the draft.

The oven damper turns the heated air away from the pipe so that it goes over the top, down the side, under the bottom, and up the back flue in most stoves and heats the oven before it makes its escape. These differ slightly in different ranges but the purpose of each is the same. Experiment with your own stove until you can control it.

Oven
Damper

Many ranges have a slide or door above the fire box which may be used for broiling. Hoods are sometimes placed over large ranges to gather odors and excessive heat and convey them to the chimney.

Whether the fuel be coal or wood, the starting of a fire and its care afterwards are much the same process. First remove ashes, brushing off the top of the oven under the covers. When the fire box is clear, put in crumpled paper, bits of wood, and then larger wood and a sprinkle of fine coal. See that all drafts are open. Replace the covers and then blacken the stove, if necessary, but polish after the fire is started. Light the paper and as the wood settles down, add coal, little by little, till it is even with the lining of the fire box. When the blue flame of coal disappears, close the oven damper, and a little later shut the slide under the fire box and the chimney damper. Open the damper when more coal is added. When coal is red it is nearly burned out.

Kindling
the Fire

To keep a fire several hours shake out the ashes, fill with coal, close the dampers, and partially open the slide above the fire.

To Keep
the Fire

For continual use it is better to add a little fuel at a time, but not in the midst of baking anything. With wood and soft coal the chimney damper cannot be closed as much as with hard coal, because there is more soot and smoke which must be allowed to escape.

Gas is an invisible fuel obtained from several sources.

Pure coal gas is more satisfactory than natural gas, or than the so-called "water gas." The escape of the latter is less easily detected and it is much more poisonous, hence there is more danger in using it.



Bunsen Burner.

For institutions at a distance from large towns a private supply of gas which is fairly satisfactory is made from gasoline, and acetylene gas is now often made even for the single house.

Gas Burners

For fuel purposes, the burners are so constructed as to admit sufficient air with the gas for complete combustion. A bluish flame is produced, which is much hotter than the yellow blaze used for light.

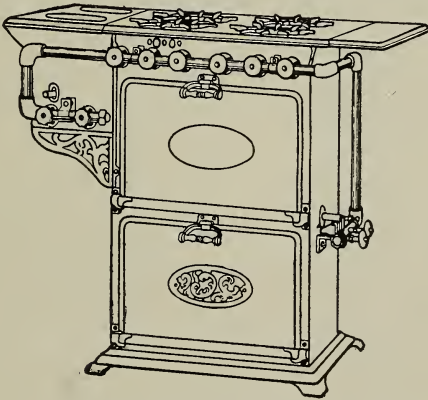
It is possible to admit too much air, which causes a loss of heat. If the air supply is adjustable, close the opening for the air until a yellow flame is produced, and then open it until the flame just comes blue again.

If a burner in a gas stove "burns back" and shows a

yellowish flame, leaving a deposit of soot on the bottom of kettles, turn it out and light it again, being careful that the gas does not ignite back in the pipe before it mixes with the air.

Gas stoves should be connected with the main supply by a pipe large enough to insure sufficient supply of

Gas
Stoves



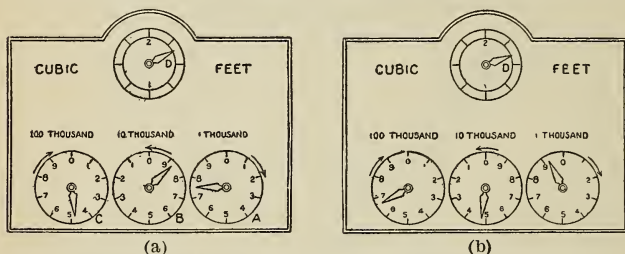
Gas Stove with Oven, Broiler, and Hot Water Heater Attachment.

fuel under all conditions. The amount used can then be regulated by the cook for each burner. Care must be taken to keep the burners and all parts of the stove perfectly clean.

The gas stove is especially adapted to the conditions of the present age; it is far less care than either wood or coal ranges, and at ordinary rates for gas, less expensive when properly operated. Even at high prices

Advantages
of Gas
Stoves

for gas it is a cheap fuel if human energy and time are considered. The application of a match makes the full power of the stove available at once and as soon as work is done, the flame may be shut off. Any desired degree of heat may be obtained at short notice with no waste of fuel and no debris to be cared for. The stoves occupy small space and each part may be used independently.



(a) Dial of a Gas Meter, (a) At the Beginning of a Month,
(b) After Registering the Amount of Gas Used for the Month.

Gas
Meter

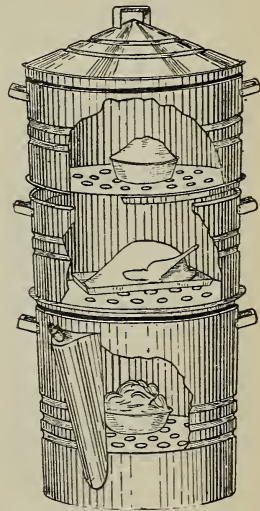
The housekeeper should learn to read a gas meter. Each space on the right hand circle passed by the hand indicates the consumption of 100 cubic feet of gas, on the middle circle 1,000 feet, and on the one on the left hand 10,000 feet. Read from left to right, taking the figure just passed by each hand and add two ciphers for the hundreds. A previous reading deducted from the present one shows the amount of gas consumed in a given time.

Example. In the illustration, the hand on dial A has just passed the figure 7, indicating 700 cubic feet; on dial B the hand has passed figure 8 (note that this

hand moves in the opposite direction to the first), and on dial C the hand has last passed the figure 4. The reading is then, $700+8,000+40,000=48,700$ cubic feet. If in a month the hands are in the position indicated in the second figure, the reading is 64,900 cubic feet. The difference between the two readings is $64,900-48,700=16,200$ cubic feet. Sixteen thousand two hundred cubic feet is the amount consumed for the month.

The small dial at the top of the illustration indicates cubic feet and is used only for testing the system for leakage.

Kerosene and gasoline are useful fuels for summer and emergency use. These are sold by the gallon and only the best qualities should be used. The blue flame kerosene probably are the best of this class of stoves. The small lamp stoves also have merit. They are similar in construction to reading lamps and should receive equal care. Two small stoves often are more useful than one large one, because more readily moved where needed. It is essential that such stoves should stand out of a draft.



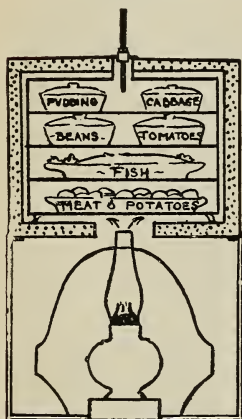
Steam Cooker, Circular Form.

Kerosene
and
Gasoline

Steam
Cooker

A steam cooker is an invaluable adjunct to the small stoves whether gas or kerosene is burned. Several articles may thus be cooked over one burner and both time and fuel are saved.

The Aladdin oven is an arrangement for saving heat. It may be used with an ordinary large lamp or with gas. The iron oven is placed inside a jacket of non-conducting substance, hence little heat is lost. It is especially useful for slow cooking.



Aladdin Oven Heated
by Lamp.

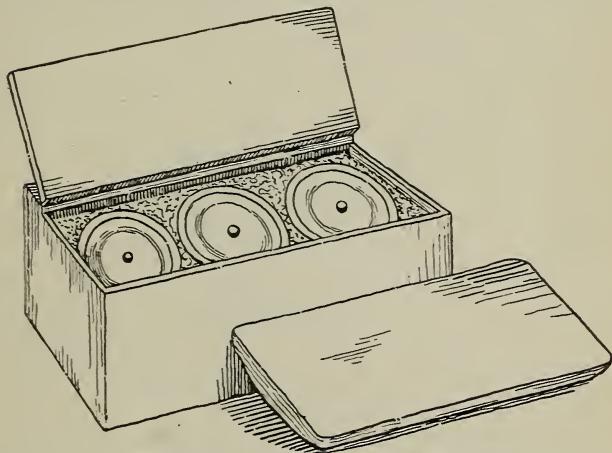
The Norwegian cooking box is another plan for saving heat. A kettle of food is raised to the boiling point and then packed in a box lined with non-conducting materials.

Chafing
Dish

The modern chafing dish is but slightly different in effect from the primitive charcoal stove or brazier. The use of alcohol for fuel makes it simple and clean. Wood alcohol—a by-product from distillation of wood—is often used for fuel, but its disagreeable odor makes it less desirable.

Anything that may be cooked over any other stove in a frypan, saucepan, or double boiler may be prepared in the chafing dish.

Heat brings out the flavors in food and develops new ones and makes soluble, substances which the human stomach could not otherwise digest. In most cases moderate heat long continued produces better results than intense heat applied for a short period.



A MODIFIED NORWEGIAN COOKING BOX.

Graniteware Pails with tight covers are packed with asbestos and covered with a pad, the lid of the box is then closed and the whole wrapped in an old blanket.

The degree of heat best adapted to make food digestible is not always that which produces the most acceptable flavor, hence cooking must be more or less of a compromise. As yet we know little about the degree of heat best suited to the perfect cooking of each food and the temperature at which it should be served.

Nothing will cook until it is warmed, and warming and drying are usually the first steps in the cooking process.

**Transmis-
sion of Heat**

The transmission of heat from a fire to our foods may be by conduction, as when heat travels along a bar of metal, by convection, when heat is transferred by the motion of heated liquid or gas, and by radiation through the air. The effect of heat on the food is further modified by the way the metal or other substance containing the food is affected by heat.

The use of asbestos in the form of mats and linings for ovens and jackets for kettles to modify the heat transferred to food is likely to increase in the future.

Boiling

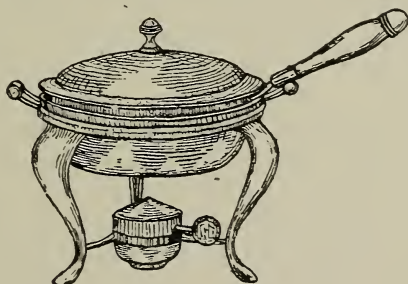
Broiling probably was the first attempt at cooking since it required little beside the fire and the heat. Roasting is a similar process applied to larger sections of meat and therefore requiring a longer time. The relationship of roasting and broiling is most apparent with a gas range for there is no line of separation between the cooking of thick steaks and thin roasts. Much so-called roasting is really baking.

Roasting

In broiling and roasting, tender portions of fish, flesh or fowls are exposed to intense heat at first to sear the outside and close the open tubes or pores which contain the juices. The fire should be free from smoke and may be charcoal or half-burned wood or coal or gas. After the surface is browned the section of meat should be drawn away from the intense heat and kept at a more moderate temperature until cooked thoroughly. More depends upon the shape of the article to be broiled or roasted than upon the weight.

When a thick mass is to be cooked in this fashion it

becomes necessary to modify the heat on the outside and to aid in driving it in by the process known as basting ; that is, dipping up the hot fat which has dripped into a pan beneath the meat and hence is known as dripping, and pouring it over the outside of the mass. The glossy brown secured by basting may have suggested to some early cook the advantage of deep frying.



Chafing-Dish—the Modern Brazier.

The difference between broiling over coals and in a hot pan is but slight and dry frying or sautering is a similar process. Toasting is a similar application of heat to foods already cooked once.

The earliest forms of baking were in the hot dishes and then in covered kettles set in coals or hung over the fire. Our ovens are an outgrowth from those primitive methods, and now much so-called roasting is really baking.

A point to study in this connection is the fact that food is fuel for the human body. The amount and

quality of fuel is varied according to the work to be done, so should the food be chosen according to the work of the individual and the climate or season of the year.

WATER

Water is not always considered to be strictly a food in itself, but by its aid many foods and flavors are put in forms more acceptable to the palate and more readily absorbed by the body than they could be in any other way.

Importance
of Water
in Cooking

Immense quantities of water are necessary for the preparation of food and the cleansing of dishes in addition to what is needed for laundry and bathing purposes. Cities make provision from some source safe from contamination for the water needed by their inhabitants. In small communities the individual family must each be responsible for its water supply. This is not the place to discuss the medical aspect of the water question, but all agree that water should be above the suspicion of danger of transmitting disease. Moreover, for household purposes water should be clean and soft, since hard water containing mineral salts hinders processes of cooking and cleaning.

A limited water supply or inconvenient arrangements for its use and disposal afterward, tend to reduce the consumption to such an extent as to interfere with the proper cooking and service of food, if not below the actual standards for health.

Nearly three-fourths of the human body is water and a similar proportion will hold in most foods served at our tables. The total amount of water taken by a human being daily averages two or three quarts, or from four to six pounds. The portion of this which is taken as a beverage depends upon the solidity of the food.

The benefit gained from mineral waters often is quite as much due to an increased consumption of water as to the mineral constituents they contain. The tendency of civilized man in feeding himself is toward too concentrated foods, too little water as a beverage and too little watery food. Water not only brings solids into the stomach in an acceptable form, but it is essential in building new tissues and removing wastes. The inside of the body, as well as the outside, sometimes requires washing.

Mineral
Water

The temperature at which water is taken into the stomach is an important point. A glass of cool water sipped slowly may have as stimulating an effect as one of wine. Often more ice than water is found in the glasses on American tables, and the ice water is taken hurriedly and interferes with digestion.

Hot water taken slowly will often revive tired people as effectually as tea or coffee. The merit of soup as a first course at dinner probably is due to the fact that it contains ninety to ninety-five per cent hot water and that the solids are largely in solution and absorbable.

If clear hot water is an unpalatable beverage, salt or lemon juice may be added to give a distinct flavor.

Flavor
of Water

There is a marked difference in flavor between water freshly boiled and that which has been kept hot for a long time. The latter has lost the gases which give life to fresh water. For any purpose in cooking stale water will injure the flavor of foods whether it be taken from a hot water faucet or from a teakettle where it has stood for hours.

Other ill flavors come into our foods because of imperfect utensils, badly washed. A rough surface or seam will retain something from previous cooking to add to the next substance cooked therein, or greasy dishwater or soap may be left in sufficient quantity to give an appreciable change of flavor.

Another important use of water essential in good cooking is for the cleaning of utensils.

Dishwashing

Dishwashing is not a popular occupation probably because repairing or setting to rights is never quite as interesting as the construction of something definite. Insufficient appliances and inconvenient conditions for the work are other causes for its unpopularity.

With a convenient sink of the right height, ample table room for soiled and clean dishes, abundance of towels and hot water, dishwashing loses its terrors.

A knowledge of the composition of each food and the way it is affected by different degrees of heat is as desirable in dishwashing as in cooking. For example, where gelatine has dried on a strainer it should be

softened in cold water, but that treatment would not be helpful if the strainer had been used for fry fat, while an egg beater plunged in boiling water would be all the harder to wash because the egg would be cooked. Time is saved by careful sorting and scraping of dishes before washing. Detergents are helpful but less important than abundance of water.

Strong soda water boiled in a utensil will remove food that has burned on. Soaking is as helpful in dishwashing as in the laundry and dishes that cannot be washed as soon as used should be covered with water. After washing, any dishes are improved by rinsing in scalding water.

Soaking
Dishes

The usual plan is to wash dishes in this order, glass, silver, crockery, cooking pans, or kettles. Often it is more desirable to get the large pieces out of the way first.

It is half a century since the first dishwashing machine was invented and though they are in general use for hotels, hand work seems better adapted to most households.

To illustrate the effect of the range of temperature from the block of ice at 32° F to the steaming kettle at 212° F let us follow the process of making a simple gelatine jelly. The gelatine has been extracted for us in factories from bones of animals and needs no cooking, but must be dissolved and combined with liquid and flavoring. It is first softened in cold water, the time required varying according to the size of the parti-

Gelatine
Jelly

cles of gelatine. Then it must be dissolved with boiling liquid. Use only as much boiling liquid as is necessary to dissolve the gelatine. The sugar, if that is to be used, added next, because it will dissolve more rapidly in a warm medium, and then is put in the fruit juice or whatever is to flavor the jelly.

The compound is to be strained and cooled. The larger the mass the slower the cooling.

Experiment. To illustrate this put half the jelly in one mould and the other half in several cups. The cup will be firm before the large mould at any temperature.

To illustrate another point put one cup in a pan of snow or cracked ice mixed with coarse salt. When some of the jelly is half thickened combine with it whipped cream or white of egg.

If possible take temperature of each with a thermometer. The key to all gelatine desserts, is to have proper proportions of gelatine and liquid and to have the right temperature for the different stages. The proportions are given by each manufacturer on the package.

METHODS OF COOKING IN WATER.

Water is as essential as fire in all processes of cookery. No food can be cooked without water and unless it naturally contains a large proportion of the fluid, more must be added during the cooking process.

Boiling

Cooking food *in* water indicates further progress in

this art than either broiling or roasting. It implies the invention of a kettle to contain the water, though the earliest cooking of this sort may have been done by dropping heated stones into a hollow one containing the water and meat or into a water tight basket. Homer and other ancient writers have nothing to say about boiled meats, though they mention those which were broiled or roasted.

Boiling, stewing, and steaming are slight variations of the same process. Under ordinary conditions, without pressure, no food thus cooked can be raised to a higher temperature than 212° F at sea level, and at high altitudes few foods can be cooked in this way, since water boils at a lower temperature.

Experiment. Much may be learned by heating a given measure of water and watching it until it reaches the boiling point.

Tiny bubbles hardly larger than the point of a pin soon form and rise to the top, but this is not boiling. The same thing may happen in a glass of water standing for an hour on the table. How will you explain this?

When the water is actually boiling large bubbles rise rapidly and break on the surface. Keep up this process until nothing appears to be left in the pan. Where has the water gone? Has anything been left behind? There will usually be a trace of coloring matter to indicate that solids do not evaporate.

This point may be made more apparent by putting a

tablespoonful of salt in the water that is to be evaporated.

What is left behind in a teakettle which is never cleaned inside though the water is allowed to boil day after day?

Evaporation

Experiment. Other simple experiments may be made with two dishes of uniform size containing the same amount of water exposed to the same heat, one covered, the other uncovered. Which reaches the boiling point first? From which does the water first evaporate?

The evaporation of water is an important factor in cooking. The rate of evaporation is proportionate to the surface exposed to the air and not to the amount of water in the kettle.

Thus the same quantity of syrup or sauce made in a shallow pan will naturally become thicker than when cooked for the same time in a deep pan having only one-fourth the surface.

Choice of Utensils

The art of the cook is displayed by the proper choice of utensils, or, if utensils are limited, by varying the time of the process or by the addition of more water for different purposes. Where long cooking is necessary choose deep utensils, reserving the shallow ones for the occasions when haste is essential.

The use of a cover serves several purposes; it protects the food in the kettle from foreign matter from outside, it aids in retaining the heat, and prevents the loss of water to some extent, as much of the steam condenses and runs back.

Even without a thermometer it is evident that water cannot be made as hot as fat, for a potato, a bit of meat, or a lump of dough might be cooked in water indefinitely without assuming the brown color which would come to any one of these articles in hot fat.

By observation also, we might discover that, however rapidly the water in a kettle boils, potatoes or other foods do not cook more quickly. In the same way we should find that absolute boiling or bubbling of the water was not necessary in order to cook some foods.

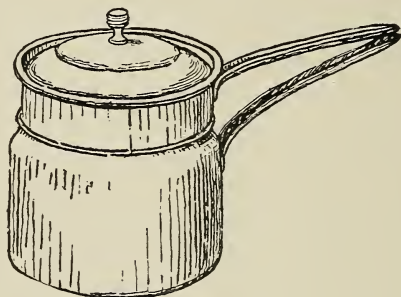
Through such observation and experience certain common laws of cooking have been established and these have been verified and explained by the experiments of modern scientists. The temperature of the water should be adapted to the type of food material to be cooked in it. Vegetables containing woody fibre to be softened require the boiling-point, while meats and eggs, of different composition, will cook more perfectly at a lower temperature. To extract juices and flavors of meats and vegetables to the fullest degree divide the substance finely to expose as much surface as possible to the action of the water and let that be cold. Soak first, then heat the whole slowly and hold below the boiling point till the end is gained.

When water is used only for the purpose of conveying heat let it be boiling hot when the food is put into it. Even then some of the solids in the food will be dissolved in the water and lost unless it be used. In some cases, as in strong flavored vegetables, this may be a

Temperature
in Cooking

Cooking
with Water

desirable loss. Mediums like hot fat, a thick syrup, or a gravy in which water is thickened with flour, by their density prevent loss of shape and flavor in the articles cooked in them. Rapid boiling in water tends to disintegrate foods. Meats are cooked to rags, potatoes become a soggy paste, and no intensity of heat is gained.



A Double-Boiler—an Invention of Count Rumford.

Stewing Stewing implies moist heat, a sort of sweating process. Boiling requires much water, at its highest temperature; stewing is done with little water at a heat sufficient to soften the substance, but considerably below the boiling point. Hence boiling is more applicable to vegetables and stewing to animal foods.

Braising Braising and fricasseeing and pot roasting are combinations of broiling or frying and stewing. Sections of meat are first browned to secure a good flavor and then stewed until tender in broth or gravy.

Water is a restless substance and is constantly escaping from the surface of our foods while they are being cooked. Keep the water in the right place, is a watch-word against many of the difficulties that arise in cookery.

When a sauce or soup is too thick water may be added. On the other hand, when such foods are too watery the surplus often may be evaporated by cooking rapidly, uncovered, for a short time.

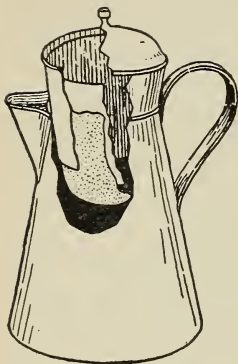
Besides kettles of various shapes, the double boiler and the steam cooker are important utensils dependent for use upon water. The double boiler we owe to the inventive genius of Count Rumford. Here is one kettle set in another containing water, and so long as there is water between a food and the fire no browning can take place in the food. This utensil is especially associated with compounds of milk and with the cooking of cereals. Though the food in the upper part does not quite reach the boiling point, this disadvantage is more than balanced by the long time which may be allowed for cooking with no danger of burning.

The
Double
Boiler

The steam cooker is found in many patterns, all on the same general plan. It differs from the double boiler in having several parts above the kettle containing the water, each with perforated bottom, so that the steam and vapor have direct access to the food.

The "bain marie" is a French device to serve the same end. One large kettle of water contains a number of

deep sauce pans. This is especially useful for food already cooked which is to be kept hot for intermittent serving in restaurants.



Coffee Pot for Making
Drip Coffee.

The prevalent idea that all food must be served the moment it is cooked is due in many cases to imperfect methods for keeping it warm.

For tea and coffee a moderately soft water is generally considered best.

The different kinds of tea receive their name from the locality where they grow and from the size of the leaf, the younger leaves furnishing the choicer varieties.

leaf, the younger leaves furnishing the choicer varieties.

Making Tea

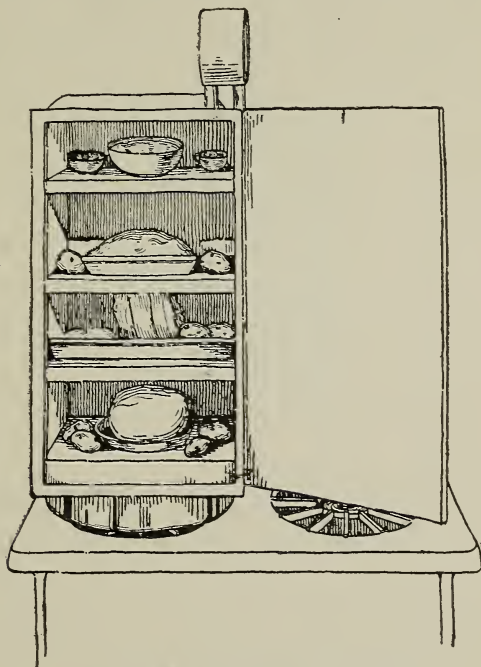
To make tea, use an earthen pot, fresh boiling water, and from one-half to one teaspoonful of tea for each half pint of water. Leave covered in a warm place to steep for three to five minutes and serve. For cold tea drain from the grounds at once.

Coffee

Names mean little in brands of coffee further than to indicate the original home of a special variety of the plant. The berry improves in quality for several years but loses flavor after roasting and more after grinding. One pound of good coffee measures about one quart and will make at least thirty full cups of strong coffee. Thus one pound should supply one person for a month

or four persons for a week. It is better to buy coffee in small lots often, unless it is ground as used.

Coffee may be steeped like tea or boiled. All things



STEAM COOKER WITH DOORS.

considered, the drip coffee pots are most satisfactory and the beverage thus made is more economical and uniform and probably less injurious than when it is boiled.

ICE

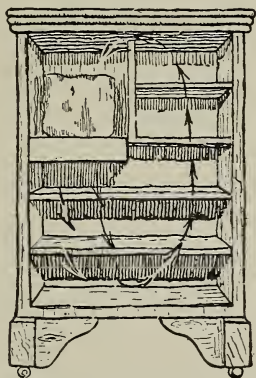
Ice is becoming more and more essential to civilized man, not only for summer use but for the year around. The future promises many improvements along this line, in more rigid inspection of the sources of the natural ice supply, in improved facilities for the manufacture of artificial ice, perhaps even in the individual home, by the transmission of cold brine as gas and water are now supplied from house to house from central plants, making it possible to dispense with the iceman's daily round. Patents have been issued for methods of cooling houses in summer similar to those used in cold storage plants. Food is now sent long distances in refrigerator cars and the whole subject of refrigeration has received much study. It has been found that different foods require various degrees of temperature.

Cold
Storage

The preservation of food by cold storage is of great benefit to armies and navies, but is not an unmixed blessing to the housekeeper for it has upset the seasons of foods, and when we can obtain a food at any time of the year it loses the charm it possessed when the season was a short one. Moreover, though food in cold storage does not spoil, it parts with something and undergoes certain changes which are not fully explained as yet. The housekeeper is usually safer in the use of canned foods than of those subjected to a long period of cold storage.

The household refrigerator is frequently expected to do impossibilities in caring for foods. It is a great labor saver when properly used and may be depended upon the year around and not merely in summer.

It should be placed in a cool, light, airy place, convenient to kitchen and dining room unless a second



A Refrigerator showing Direction of Air Currents.

refrigerator be placed there. If possible place it near the door so that the ice man need not track all over the kitchen floor. The cellar is no place for a refrigerator. A good cellar is a safe place for most foods, and a poor one will injure the refrigerator.

In many households the cost of ice is more than saved by the preservation of food that would otherwise be lost. The average family will use from one to two dollars' worth of ice a month at city prices.

In modern houses the water pipe from the ice com-

partment of the refrigerator is often connected with the sewer pipe. This should never be direct. Let the pipe drip into a spout.

A refrigerator should have several compartments, that foods like milk and butter may be kept apart from others. The coolest place is usually under the ice. A tile or enamel lined refrigerator has many advantages, but any that are properly made if kept clean will do good work. Any break should be repaired at once, for an overflow of water or a crack in the lining may cause an odor which will flavor all food.

Care of
Refrigerator

The ice should be washed clean before putting in place and no food should ever be placed upon it. The jars of water chilling for table use are the only things to be allowed beside the ice in its compartment. No food should be put away while warm.

How often a refrigerator should be cleaned depends upon the way it is used. If nothing is allowed to spill or rub against the sides or shelves, or, when this happens, if it is cleaned away at once, and if nothing stays there until unfit for food, frequent scalding is unnecessary. Every week or fortnight when the ice is nearly out remove shelves and scald them thoroughly and wash throughout.

Glass and stone jars, deep earthen and agate plates are the best utensils in which to put foods away in the refrigerator.

The principle of the refrigerator is exactly that of

the Aladdin oven—a closet with shelves is put inside a case of non-conducting substance.

On the same plan, our ice cream freezers are built. The outer tub is a non-conducting substance to prevent the entrance of heat.

Ice Cream
Freezer

There are jugs for hot water and coolers for ice water constructed according to the same idea.

Salt is mixed with ice because its affinity for water will cause the ice to melt, and when a solid changes to liquid form, heat is absorbed from the surrounding objects. Cracked ice about the size of coarse rock salt is used, the proportion being three parts ice to one of salt.

Ice cream, custard, or fruit juice to be frozen, should be more highly flavored and sweetened than if it were to be eaten at an ordinary temperature. The organs of taste are benumbed by the cold, and a stronger flavor is necessary to produce an effect. The cost of ice for making frozen desserts is less than the cost of fuel for cooking many.

PREPARATION AND PRESERVATION OF FOODS

All processes of cooking are the result of gradual evolution. Nature ripens fruits and seeds in the sunlight. Dry nuts and seeds are stored by squirrels and other creatures. Primitive men were but little in advance of the squirrel when they saved different grains and pounded or parched them for food.

Uncooked Food

We may understand better the origin of our processes of cooking if we first consider the foods available without special preparation. Tropical countries have always afforded a variety of fruits capable of sustaining human life. It is estimated that many more persons may be supported on a given piece of ground planted to bananas than by the same surface planted with any crop in a temperate climate. The breadfruit, fig, date, and raisin are other important fruit foods.

In temperate climates without knowledge of agriculture mankind must depend largely upon animal foods, and doubtless here would come the first application of heat to change the flavor or to aid in preservation of the food from day to day.

Preserving Food

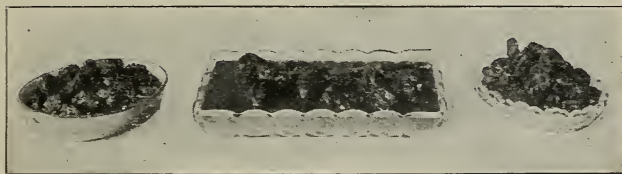
The drying of fruits and the smoking of meats naturally were the earliest methods of preserving foods. Probably the preservative action of smoke was accidentally discovered and the salting of fish may have been derived naturally from its association with salt water.

Since all foods are mainly water it was an immense advantage to wandering tribes to reduce their burdens

by drying their foods. Even the most primitive housekeepers discovered that in proportion as food parted with water it was less liable to ferment, mould, or decay, though the scientific reason for this that most bacteria can live and develop more rapidly in fluids has only been discovered recently by bacteriologists.

The modern housekeeper seems to be losing the art of drying foods, yet in many cases that mode of preservation is more desirable than canning or cold storage.

Dried
Foods



Dried Prunes Before and After Soaking.

One reason why dried fruits have fallen into disrepute is this: To remove the discoloration which takes place when cut fruits are dried or evaporated in factories they are often bleached by sulphur and suffer loss of flavor. Another reason for not using dried foods is that it takes time to soak them.

When they are to be made ready for use the first step is to supply as much water as they lost from evaporation. This is best accomplished by long soaking without heat, merely cooking them enough at the end to soften tough fibres and to prevent fermentation.

Honey and olive oil may be considered with the food products requiring little preparation. They were commonly used by the ancients.

Nuts

Nuts are an important food in some parts of the world. The peasantry of southern Europe find in the chestnut a substitute for cereals. It is made more digestible by a partial cooking. The neglect of nuts in our country is due to the cheapness of cereal products but there is an increasing use of them as a substitute for meats. Average shelled nuts have weight for weight about twice the fuel value of wheat flour because they contain so much fat. Chestnuts are about two-thirds starch, and contain little fat. Other nuts are from one-third to two-thirds fat.

It is a common idea that nuts are very indigestible. That may be changed if we learn to masticate them properly or to grind them and combine with other foods instead of eating them without chewing properly, as dessert after sufficient nourishment has been taken.

Nuts and fruits supplement each other, to some extent, the one containing what the other lacks.

The leguminous seeds, peas, beans, lentils, and peanuts, are somewhat like nuts, but are not so rich in fat and are unpalatable unless cooked. Most of our common vegetables are the result of ages of cultivation.

Fruits

We are only on the threshold of the possibilities of combining and preserving fruits. An increased use of fruit, fresh and preserved, will tend to cause a diminished use of alcoholic beverages. Fruit juice is one

of the best agents to quench thirst. A desire for some other beverage than water may be taken as a cry for food. Fruit juices, hot or cold, will better supply this desire than tea or coffee. The expressed juice of real fruit may be sterilized and then charged with carbon dioxide, as well as the chemical compounds now sold as soft drinks.

Inferior fruits and skins and cores, if clean, may under pressure yield juice for jellies, or to flavor other foods. Fruits may be blended, pressed, and strained, and used in many ways even for children and invalids when the solid particles and seeds would prove irritating. The juice of the lemon or orange and the pulp of the banana may thus be combined.

Jellies

Since modern housekeepers lack patience to dry foods and soak them out again the canning factory has come to their aid. Within the last half century this business has developed immensely. Home canning cannot compete with that of the factory, because there a higher temperature is gained which more effectively sterilizes the food.

Canned
Goods

Canned foods keep because the bacteria in them are destroyed and others cannot enter because the air is kept out. Fruit will not spoil even if the jar is not full, provided the air above it has been sterilized.

Unfortunately, ignorance of the processes involved makes the consumer demand impossibilities in color and form, and this has led the manufacturer to use artificial colorings freely.

Preservatives of different kinds have been found to be cheaper than care and time expended in the preparation. Clean foods keep better than unclean ones, but skilled human labor is the means to cleanliness and that is expensive.

Preserving
in Sugar

Pound for pound preserves which include jellies made from fruit juice and marmalades from fruit pulp with equal weight of sugar keep even if exposed to air, because bacteria do not flourish in dense substances.

Some fruits are preserved half by drying in the sunshine, half by sugar. Spiced fruits were more common before the days of air-tight jars, for spices are enemies of bacteria.

Canning

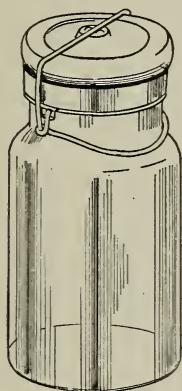
The canning of food is not a complicated process. Everything must be clean, that is, free from spores of mould or germs that promote decay. Such cleanliness may be accomplished in part by water, partly by heat. The jars, covers, tunnels, and spoons must be subjected to boiling water to render them sterile. They are usually put in cold water which is slowly brought to the boiling point. The scalding of tomatoes and peaches not only renders the skin easy of removal but sterilizes the outside so that nothing is rubbed on to the inner surface as it is peeled.

An accumulation of dust, mould, and decayed portions, even if each be slight, cannot but affect the result. Therefore the fruit for any purpose must be carefully picked over and washed. Very juicy fruits, like currants, may have the juice expressed without first

cooking, while others, like the crab apple, require the effect of heat to start the juice.

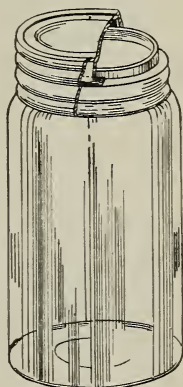
The utensils for cooking and straining should not be of metal if the best flavors of the fruit are to be retained. Agate or earthen ware kettles, wooden spoons, and linen strainers are desirable for this work. If

Utensils
for Canning



"LIGHTNING."

PRESERVE JARS.



IMPROVED "MASON."

necessary to use metal anywhere, do it as quickly as possible, and never leave an iron spoon in a kettle of cooked fruit.

Sugar is not essential to canning, but is usually added for flavor and because fruit cooked in a syrup keeps its shape better than when cooked in water.

The best jars are those having glass covers and fastening with a spring. The screw tops are easily rendered imperfect and are hard to close and open.

Preserve
Jars

The less lettering there is in the glass the surer we are of keeping it clean. The rubber rings spoil quickly and none that are stretched or brittle should be used. New ones are usually required every year. Pint jars are more satisfactory for the average family than the larger sizes.

A grocer's tunnel is desirable for filling the jars, and a half-pint dipper with a long handle is another help.

Essential
Points

The essential points in canning fruit may be summed up in very few words. All that is necessary is to have the fruit and everything that comes in contact with it sterilized, and then keep the air away from it. That is, the fruit and whatever it touches must be raised to a sufficient degree of heat to destroy any micro-organisms already there that would cause change of form or decay. This being done care must be taken that no others are allowed to enter through the air. There is no magic about it, only constant watchfulness.

Gentle cooking, long continued, seems to be fatal to the bacteria, which might work so much ill, and this method is more conducive to preserving the natural appearance of the fruit than is intense heat for a short period.

Fruit, vegetables, milk, and meats all are prepared in similar fashion. Animal foods spoil easily because of their composition.

CHOICE OF FOOD

Primitive man made use of anything near his hand to satisfy his need and accidents and extreme hunger made many foods appetizing to our ancestors which might not appeal to us today if we had not inherited the taste for them.

According to W. Mattieu Williams, "the fact that we use the digestive and nutrient apparatus of sheep, oxen, etc., for the preparation of our food is merely a transitory barbarism." Other authorities agree with him that the art of cooking may some time be so developed as to enable us to prepare the coarser vegetable substances in an easily assimilated form without depending upon animals as middle men.

The art of the cook has done much to make unlikely food materials attractive, but there is another phase of the question, and that is the problem how to make what we know is nourishing both pleasant and attractive. The cook of the past had to make the best possible use of the meager nutrients at hand. The cook of the present and future has the harvests of the whole world within reach all the year around. How shall such abundant material be combined to satisfy the palate without overloading the digestive organs?

The Art
of Cooking

More important still, how shall we select and prepare foods that they may produce sufficient energy in the human body for the great tasks awaiting it in our complex civilization.

During the last twenty years or less much material has been published by the U. S. Department of Agriculture recording the results of investigations. Many of these pamphlets can be secured for the asking.

Classification
of Food

For practical use all the principal substances found in our foods may be classified under five heads: water, mineral matter, protein, fat, and carbohydrate. The first, and its importance in cooking, has already been considered. The second appears in different forms in all foods, rarely exceeding one per cent. of their natural weight. This it is which remains as ash when a food is burned. It is most prominent in the refuse portions of food which are removed before coming to the table, such as the husks and bones. Some of these mineral matters are readily soluble in water, hence are lost when no use is made of the water in which vegetables are boiled.

Common salt is the principal mineral substance in use in cooking.

Organic
Foods

The other three great classes of food substances are known as organic compounds,—the protein, fat, and carbohydrate.

The proteins are subdivided into many classes, but so far as practical cooking is concerned, little need be said of these here. Since this type of material constitutes about one-fifth of the human body by weight it must be found in the daily food. Lean meat, eggs, milk

*Following the nomenclature of the U. S. Department of Agriculture, the term protein is used to denote all classes of nitrogenous foods.

curd, and portions of grains and seeds are the principal sources of this class of food. As a whole, protein of vegetable origin is more slowly and less perfectly absorbed than animal protein. The principal duty of nitrogenous foods is to build up the body and to keep it in repair.

Fats are obtained from both animal and vegetable sources and for the convenience of the cook are commonly separated by heat or pressure. Considerable fat is stored as a reserve fund in the normal human body. Its principal office is that of fuel to keep the body's machinery going.

Fats

Carbohydrates are chiefly of vegetable origin and include starch and sugar. They are not apparent to any extent in the body but are important fuel foods, though more than two pounds of starch or sugar would be required to produce as much energy or bodily heat as one pound of fat.

Carbo-
hydrates

The provider of food, the cook, and the consumer all should be familiar with the composition of common foods in order that the daily meals may be adapted not only to purse and palate but to climate and the condition of individual bodies.

MILK AND ITS PRODUCTS

Milk is a complete food for the young animal because it contains the five fundamental types of food material—water, mineral matter, fat, carbohydrate, and protein.

The analysis of average milk is about as follows :

	Per cent.
Water .....	.87
Mineral .....	.01
Fat .....	.04
Casein .....	.03
Sugar .....	.05
	<hr/>
	1.00

Since the fat is the most valuable portion commercially, dairymen study to feed their cows in such a way as to increase it, and in some instances milk has been produced containing 6 per cent of fat.

Use of
Milk

Though mainly water, milk is a valuable nutritious food and should be used freely by itself and in combination with other food materials, in soups, sauces, and puddings. When we remember what the department of agriculture has proved for us, that a quart of milk is quite as nourishing as a quart of oysters for which we pay six or eight times as much, we can see that it is desirable to use it more freely than is generally done. Especially during the summer months we do well to substitute milk and cheese for meats. There are average families which do not use over a pint of milk a day; there are others who find it neces-

sary to take a gallon, and the meat bill in the latter cases becomes proportionately small. A pint of milk a day is not an excessive allowance for each member of a family, though many households consume much less.

To study the composition of milk put a quart of fresh milk in a glass jar and leave it twenty-four hours or longer until it is thick and sour. What percentage of the whole is the cream? Remove the layer of cream on top to another jar, screw on the top, and shake until the fat separates from the watery portion of the milk. Collect the butter on a spoon, wash out the milk by pressing and folding with a knife. Weigh or estimate carefully the value of the butter obtained. What proportion of the original bulk of milk does it represent? Persons fond of unsalted butter may thus prepare it for themselves.

Composition
of Milk

Why is salt added to butter?

The remainder of the milk, now a thick mass of curd, may be pressed out with a spoon or cut with a knife to show the greenish water known as whey. What nutritive substances are there in this?

Turn the thick milk into a two-quart pan and fill with hot water, in twenty minutes drain the water off through a strainer, that no curd need be lost, and pour on more hot water. Do this several times until the curd loses its sour taste and has contracted, but do not allow it to become too hard. If boiling water is used the curd will become unpalatable and indigestible.

Buttons have been made of sour milk treated by heat and pressure.

Sour
Milk
Cheese

Press as much water as possible from the curd and compare the quantity with the original amount of milk. Remember that this still contains much water. Now combine the curd with butter or thick cream, salt it and shape in small balls or pack in cups. Thus we learn something of the value of milk and have made a sour milk cheese more palatable than when the whole mass of curdled milk is heated on the stove or strained in a cloth.

Junket

With prepared rennet in liquid or tablet form the curd and whey of sweet milk may be separated. The milk should be warmed slightly before the dissolved rennet is added, then chilled in the dishes from which it is to be served. This is known as junket or rennet custard.

Absolute cleanliness is essential for every utensil to come in contact with milk. The souring of the milk is due to the action of bacteria which come to it from contact with utensils and the air. Its fluid form and nutritive material afford a medium peculiarly favorable to the development of germs of disease, as well as to the growth of useful bacteria which aid in butter and cheese making.

The growth of such micro-organisms is hastened by moderate heat, but most of them are killed by raising the milk to the boiling point.

Sterilization requires a temperature of two hun-

dred and twelve degrees F, continued for about twenty minutes; this process usually changes the flavor of the milk so that it is disagreeable to many palates. The high temperature also causes the fat globules to separate instead of being retained in the form of cream.

Pasteurization takes its name from the noted French scientist, and consists in raising the milk to a temperature of about one hundred and fifty-five degrees F. By this means the flavor of the milk is unchanged.

To Prevent
Souring

The cook finds it safe to scald the milk for soups, bread, or puddings, to prevent its souring during the process, before cooking it with the other ingredients. There is a gain in the time of cooking when the milk is heated while the other materials are being prepared.

A bit of bicarbonate of soda dissolved in milk before it is heated often will neutralize any incipient acidity and make it usable for puddings or soups. The "cream" of tomato soup is liable to curdle unless the acid of the tomato is neutralized by soda or the milk thickened with flour before the two parts are combined. It is safer with all "cream" soups to keep the stock and thickened milk apart until just before using.

Neutralizing
Acidity

Lemon or other acid fruit juices are sometimes mixed with milk for sherbet without curdling if, before the juice is added, the milk is thoroughly chilled in the freezer can.

Mixing
with Acid

Salt sometimes curdles milk, especially when it is added to hot milk.

Since the solid portions of milk readily adhere to the bottom of the saucepan placed in direct contact with heat, and the resulting burned flavor rapidly penetrates the whole of the milk, a double boiler or its equivalent, one dish set in another of boiling water, is the best way to heat milk.

Milk is an important ingredient in preparing cocoa and chocolate, and such beverages rank with soup in nutritive value. Hot milk sipped slowly is a simple remedy for exhaustion and sleeplessness. Hot milk should be served with coffee when cream is not available. The milk soups are valuable foods and have as their foundation the white sauce described further on.

Most of our puddings require milk, especially the cereal and custard varieties.

Cooking
in Milk

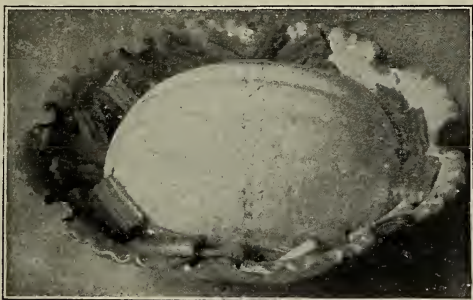
Because there are solids in the milk more time must be allowed for the grains of rice or corn meal to absorb the moisture than when cooked in water. The protein portions of the milk have somewhat the same effect as the egg used to coat the croquette or oyster before frying. If the particles of grain are thus varnished over they cannot absorb moisture as rapidly as from clear water. Hence, it is often advisable to cook the grains in water first and finish the process in the milk.

In making blanc mange from Irish moss, if the moss is first cooked in a small quantity of water and

the thick paste strained before it is added to the milk, there is no loss of milk. When the moss is cooked directly in the milk there is some loss of milk when the moss is strained out.

The baked Indian meal pudding and the creamy rice pudding require long, gentle baking. There is a continual evaporation of moisture from the surface of

Concentrated
Milk



"BLANC-MANGE."

the pudding pan, and really a condensing of the milk. In proportion as the pudding dish is refilled with milk, the pudding increases in nutritive value.

Milk is commonly used for mixing dough of many types and this adds to the nutritive value of bread and cakes.

Bread made of milk or part milk will have a browner, tenderer crust than bread made wholly with water. There seems to be good ground, however, for the prevalent idea that bread or cake made with milk does

not keep so well as that made with water. A certain cheesy flavor develops where milk is a principal ingredient.

**Sour
Milk**

Sour milk is often used for mixing griddle cakes and quick doughs, because the acid it contains will be neutralized by the soda added, and thus produce the effervescence which makes the dough light. The souring process seems to have so affected the protein substances in the milk that such a dough is tenderer than one made with sweet milk and baking powder. The use of sour milk will be further treated in the section on doughs.

**Skimmed
Milk**

For doughs, soups, and puddings, in which additional fat is introduced, skimmed milk may be used as well as full milk.

The use of cream in well-to-do families is increasing. Whipped cream is demanded as a garnish or sauce for many desserts quite complete in themselves.

The process of beating or "whipping" cream gives it an attractive appearance, and by expanding its particles probably makes it more digestible.

BUTTER

Butter is one of the most digestible forms of fat. An ounce of butter a day is a fair allowance for each person when meats, lard, olive oil, and cream are used. To test this in your own case, divide one ounce of butter in three portions, one for each meal, and see whether you naturally use less or want more. Or, this

may be tried in a family by shaping a portion of butter into balls with butter paddles and noting the amount consumed by each person at the table. An ounce of butter is easily secured by cutting a quarter pound pat into quarters. Or, if that is not available, measure the butter. Two level or one round tablespoonful is equivalent to one ounce. A pound of butter will measure one pint.



Individual Shortcakes to be Served with Whipped Cream.

Butter is probably rendered slower of digestion by cooking, and for this reason it is wiser to flavor foods with it after they are cooked. Often it is better to allow the individual eater to butter the broiled meat, or fish, or mashed vegetables, according to his own taste. Then there need be no waste if a portion of the whole dish is not eaten, and if the food is reheated the flavor is better.

In one dietary study of the Department of Agriculture of the United States (Bulletin 75 from the office of Experiment Station), so much butter came back in

Butter
for Flavoring

the platters where it had been poured over steaks, chops, and fish, that it was assumed that none was consumed. Certainly, in every household considerable butter and other valuable fat finds its way to the dish water. One of the first steps in the application of science to housekeeping is to stop such needless waste.

Composition
of Butter

In a glass measure cup, or a tumbler, put a quarter of a pound of butter, set the glass in a pan of warm water and leave until the butter melts.

Estimate the percentage of clear fat.

What other substances appear to be present?

How does this explain the sour and cheesy tastes sometimes noticed in butter?

White
Sauce

Milk thickened by flour and made richer with butter and flavored, is known as milk gravy, drawn butter, or white, or cream sauce. It is a substantial food in itself and forms a valuable addition to fish, eggs, meats, and vegetables. By its addition a small portion of any food substance is extended and made to do more service, and flavors too pronounced to be agreeable to all are much modified.

There are several ways of compounding this sauce which apply to other sauces in which butter is the principal ingredient. A general formula covering the ordinary sauces—white, tomato, and brown—is this: one ounce of butter, one-half ounce of flour, and one-half pint of liquid; or, to express the same quantities in other terms, two level tablespoons of butter, the same of flour, and one cup of liquid.

1. Melt the butter in a saucepan, stir in the dry flour, cook and stir until frothy all over, then draw to a cooler part of the stove and stir while adding the liquid hot or cold, then cook again till thick, stirring till smooth.

2. Another way is to rub butter and flour together and stir into the warm liquid in a double boiler, then stir till thick and smooth.

3. When thin cream is substituted for butter and milk, or when less butter is to be used, rub the flour smoothly with a little cold liquid and stir into the remainder, which should be hot, and cook over water until smooth. Then add butter and season.

The theory of the first method is that the butter attains a slightly higher temperature than the milk and if the flour is combined with the hot butter it is cooked more quickly and thoroughly than when put into milk.

In the second case, longer time is required, but the flavor of the butter is changed less than by the first method.

The third way is more economical of butter.

Butter is also used for brown sauces. These are made after the first plan for the white sauce, but the butter is allowed to brown before the flour is put in, and is cooked until a reddish brown hue is acquired before the liquid, which is usually brown meat stock, is added.

**Varieties
of White
Sauce**

In many other sauces the plan is similar to that followed in making the white sauce, but meat stock, strained tomato, or other vegetable stocks, are used in place of part or all of the milk.

These sauces are the foundation of many entrees or made dishes, such as croquettes and soufflés.

For meat or fish croquettes the sauce is made of a double thickness by using only half as much liquid. It is then combined with about an equal quantity of meat, seasoned and cooled, when the mixture may be shaped. Soufflés have the sauce as the basis and the puffy effect is produced by eggs.

**Creamed
Dishes**

The usual white sauce, combined with an equal quantity of meat, fish or vegetable stock, gives us the cream soup, cream of chicken, cream of cod, cream of asparagus, etc., etc.

Since butter is not pure fat but contains water and curd, it is less desirable than other fats for greasing pans unless it is melted and the fat used alone.

**Precautions
in Using
Butter**

Except in cases when it is necessary to brown something quickly, butter should not be used for frying or sautéing. It is too expensive and burns easily. Because of the quantity of milk, often sour, contained in butter, it is not strange that some recipes for rich cake call for small quantities of soda to balance this acidity. For such purposes, butter is frequently washed to remove milk and salt.

That butter responds quickly to changes of temperature should be remembered in mixing any dough,

like pastry, when a large proportion of butter is used.

Slightly rancid butter may be made usable for some purposes by scalding it in water, then chilling and removing the cake of fat on top. If further treatment is necessary the fat alone may be heated with bits of charcoal.

Rancid
Butter

CHEESE

The origin of cheese is probably more ancient than that of butter. It is a form of dried or condensed milk convenient for transportation. Milk is nine-tenths water, while cheese contains but a trifle over three-tenths water. Average cheese is about one-third each water, fat, and casein.

Composition

A pound of cheese costing sixteen cents contains about twice as much nutritive matter as a pound of meat which will vary in price. There will be less waste in the cheese than in an average piece of meat. Moreover, cheese has the advantage of keeping better than the meat under adverse conditions. Its disadvantages are that because of its concentration it is not easy of digestion. This may be overcome somewhat by diluting the cheese with milk, as is done in many of the rarebits, fonducs, and soufflés. The addition of a small quantity of bicarbonate of potash or soda aids in making cheese soluble. There is danger that the cheese will be over cooked. When merely melted it is probably quite as digestible if used moderately, as

Nutritive
Value

many of our common ways of preparing meat. Judging from the types of people who depend upon cheese largely it might be used with us more generally than it is. The annual consumption of cheese in this country is only about three pounds per capita. We might well use cheese more freely in cooked dishes, for flavor as well as for nutriment.

TEST QUESTIONS.

PRINCIPLES OF COOKERY.

PART I.

Read Carefully. Place your name and address on the first sheet of the test. Use a light grade of paper and write on one side of the sheet only. *Do not copy answers from the lesson paper.* Use your own words, so that the instructor may know that you understand the subject. Read the lesson paper a number of times before attempting to answer the questions.

1. Give a rough diagram of the stove or range with which you are most familiar. Show where in the oven and on top of the stove the heat is greatest, and explain why.
2. What is your method of starting and regulating a coal fire?
3. Counting the time required to keep fire and stove in good condition, what is the most economical fuel within your reach?

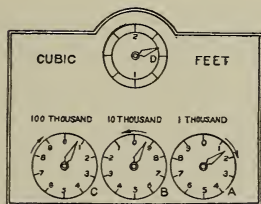


Fig. 1.

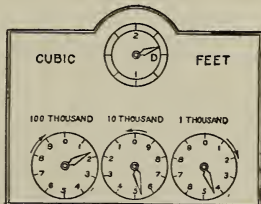


Fig. 2.

4. Fig. 1 represents the dial of gas meter at the beginning of the month; Fig. 2 at the end of

PRINCIPLES OF COOKERY.

the month. What is the reading in each case, and what will be the amount of the bill at \$1.25 per 1,000 feet of gas?

5. If you use a gas stove, read the meter before and after a day's baking and find the cost of fuel. If other fuel is used, give the amount and approximate cost.
6. Where, in your experience, would a thermometer be helpful in cookery?
7. Mention several foods requiring the action of heat, yet which need little preparation and few utensils.
8. What different ways have we of cooking with the aid of water?
9. Is it possible to cook in water that does not boil? Give examples.
10. What gain in cooking certain foods over, rather than in, water? Describe utensils by which this can be accomplished.
11. What kinds of foods should be kept in the refrigerator? Describe the refrigerator, or whatever is used in its place.
12. What are the essential points in canning fruit?
13. How should dried fruit and vegetables be prepared to restore them as nearly as possible to their original condition?
14. Are there any substances suitable to add to foods as preservatives?

PRINCIPLES OF COOKERY.

15. What are the relative merits of paper bags, wooden boxes, tin cans, and glass jars for keeping groceries in pantry or store closet?
16. How can you determine for yourself that there is water and fat in milk, cheese, and butter?
17. Make a menu for meals for two days, introducing as many dishes as feasible that contain milk or cheese.
18. Suggest treatment and uses for sour milk, dry cheese, and butter, of poor flavor.
19. Make a white sauce three times or more, putting the ingredients together in different order each time, and report which seems the most satisfactory and expeditious.
20. Are there any questions which you would like answered, relating to the topics taken up in this lesson?

NOTE.—After completing the test sign your full name.

Principles *of* Cookery

PART II

LESSON PAPER

PREPARED BY

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American School of Household Economics

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AMERICAN SCHOOL OF HOUSEHOLD ECONOMICS

PRINCIPLES OF COOKERY

PART II

EGGS

Since the egg is similar to milk in composition, both containing water, fat, and protein, without starch, and as there are many simple dishes in which milk and eggs are combined, it is natural that that should be our next topic.

The egg may seem a small article to have much space devoted to it, but there is no other food so indispensable to the art of cooking. A French chef has compared the office of eggs in cooking to the usefulness of *the*, *an*, and *a*, in conversation, both would be difficult without them.

Aside from its great food value, and there is no egg of bird that may not be eaten, the egg is a general harmonizer in the kitchen; it serves to thicken custards and sauces; to clarify soups and jellies; to make a coating of crumbs adhere to chops or croquettes; it puffs up soufflés; it leavens a whole group of cakes; it garnishes salads and emulsifies oil into a smooth, rich dressing for them, and combined with odd bits of fish or meat, it makes many a savory dish of what would otherwise be lost.

Usefulness
of Eggs

The composition of eggs varies with the kind of fowl and its food. The edible portion of the average hen's egg is nearly 75 per cent. water, 12 per cent. protein, 12 per cent. fat, and 1 per cent. ash or mineral matter.

Since carbohydrates are lacking, we naturally combine eggs with starches and sugar which supply the class of substance missing.

Like milk, eggs may be eaten either raw or cooked, and the ways of cooking eggs, however elaborate they seem, may be reduced to a few simple processes.

We shall have the key to all cookery of eggs if we study some eggs cooked by moderate and some by intense heat.

Effect
of Heat
on Eggs

To see how the egg is affected by different degrees of heat, we may poach several eggs, or drop them from their shells into water at different temperatures. When an egg is dropped into a saucepan with cold water, and heat applied, before the egg begins to cook, the egg and water mingle somewhat, showing that a portion of the raw egg is soluble in cold water. As the water is heated, this soluble egg becomes cooked and rises in a thick froth on top, and if the cooking is continued longer, this froth may contract and settle. This point is turned to the cook's advantage in clearing jellies, soup stocks, and coffee. Thus even the little portion of the egg white adhering to the shell is sometimes utilized for clearing coffee.

When an egg is dropped directly into boiling water, the outer portions of it are hardened by the heat. This cooked egg does not appear to be soluble itself and, moreover, protects the under portion until that also is penetrated by the heat.

Experiment.—Boil one egg rapidly; put another into the boiling water, remove from the stove, and let stand for fifteen minutes or more. Compare temperatures with a thermometer. See which egg is more tender, and presumably, more easy of digestion.

The white and yolk of eggs cook at different temperatures, and these appear to vary slightly with the freshness of the egg. For general use it is sufficient to remember that 150° to 180° F is ample heat for dishes composed mainly of eggs and milk. When starch is used, a higher temperature is required, and whenever possible, this should be obtained before combination with the eggs. Having learned this, we have the key to the successful cooking of all custards and the like. A custard that has curdled, or wheyed, or settled in the center, has cooked too long, or in too hot an oven. The custom of setting a custard in a pan of water in the oven is wise, for the moisture lowers the temperature of the oven. Excessive beating of eggs may aid the curdling of the custard; it certainly is a waste of effort here, however it may be in cake making.

Average custards are made with three to six eggs to a quart of milk; naturally the larger number makes a firmer custard, but the other is quite palatable. Often

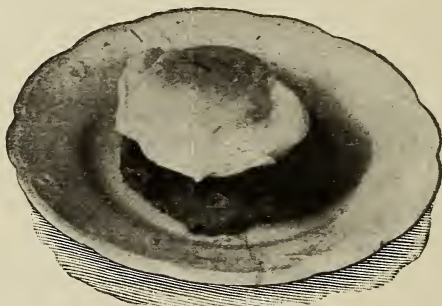
Temperature
for Cooking
Eggs

Custards

gelatine or corn starch is used to assist in thickening milk when eggs are expensive, but these combinations are not real custards.

Eggs
with Starch

There is a long list of puddings where a custard or egg and milk are combined with starchy materials. In such cases as have already been stated, it is wise to have the starch, whether in the form of rice, tapioca, sago, or corn starch, cooked in the milk before the



POACHED EGGS ON FISH BALLS.

egg is added. Bread or cracker crumbs may be combined directly with the milk, for then the starch has already been cooked.

Dropped
Egg

A single dropped egg may show that water need not boil in order to cook an egg. Even if a thermometer is not available, it can be seen that the white of the egg instantly changes in appearance when it comes in contact with water far below the boiling point. A muffin ring placed in the water assists in keeping the egg

in good shape. A little salt and lemon juice or vinegar in the water makes the egg harden quickly on the outside instead of mingling with the water.

Since we reckon the cost of other foods by the pound, for easy comparison we must estimate the value of eggs on the same basis. It will be found that the average hen's egg weighs about two ounces, and that eight good sized eggs in their shells, or nine or ten shelled eggs, weigh one pound. The fuel required, the labor of preparation, and the waste are much less with eggs than for most other foods.

Value

Some experiments recorded in "Eggs and Their Uses as Food" (Farmers' Bulletin No. 128, U. S. Dept. Agl.), show that it cost more than twice as much to serve and satisfy at breakfast a family of over one hundred women in a college boarding hall with mutton chops or beefsteak at less than 20c. per pound, than with eggs at 25c. a dozen.

Commercially, there are many grades of eggs, dependent upon their age. Cold storage has done away with most other methods of preserving eggs. Anything that will exclude air, without bringing ill flavor to the egg, will aid in preserving it. Eggs are available almost everywhere at all seasons and even at their highest prices, are not more expensive than the choicer cuts of meat.

Preserving

An inferior egg injures all other materials with which it is combined, therefore it is never economy to buy poor eggs. When eggs are high do without them,

making dishes which require few, if any; then when they are again plenty they will be all the more appetizing. With proper conditions for keeping eggs, it may be economy for some housekeepers to buy a large quantity in the fall and pack them carefully in an upright position, but many find it better to give the grocer a few cents more than to take the time and risk of loss.

COMBINATION OF EGGS WITH OTHER FOODS.

Any fundamental food, like the egg, must be served in a variety of ways or we tire of them. Foods having short seasons should be prepared in the simplest fashion.

Variety

The nutritive value of the food is not materially changed by a variation in the method of cooking, provided no additions are made to it. It may appeal more to the palate in one form than another, and the time of digestion may vary, though in the end as much may be absorbed in the one case as in the other.

Combinations to Reduce Cost

To illustrate this point, let us take two eggs costing at average prices two cents each, or four cents. Whether boiled in the shell or dropped from the shell into boiling water, their food value would be practically the same; when scrambled or made into an omelet there is a slight addition of nutritive material.

But the rigid economist says that eggs at two cents apiece are too expensive for the family of limited means. Then comes in the art of cooking to show how the eggs may be combined with less costly food ma-

terials to make several palatable dishes which may take the place of meats and yet require but little more labor in preparation.

First, the two eggs may be combined with one cup of white sauce; this may be served with the omelet, or blended with the scrambled egg, or made into a soufflé, or served with hard boiled eggs chopped or sliced.

With
White
Sauce

The identical quantities might be used in each case. By such combination the cost of the dish is doubled, but it will go at least twice as far and its fuel value is more than trebled. Or, instead of the sauce, we may use one cup of milk thickened with white bread crumbs and well salted and omit the butter or use less. This will reduce both cost and fuel value.

The foundation may be again extended and varied. To the two eggs and cup of white sauce may be added two ounces of grated cheese or two ounces of chopped ham. If the ham is of average fatness, the fuel value of the cheese and ham will be about the same. The ham might be more expensive than the cheese were it not that this is a way to turn to good account the smaller bits of meat. By this addition the dish, at two and a half times the cost of the eggs, becomes about five times as efficient in fuel value.

With
Cheese
or Ham

This combination may be served in many forms,—the cheese may be warmed in the sauce and poured over the eggs hard boiled, poached or made into an omelet, and the ham might be used in the same way.

Serving

After mixing sauce, cheese, and yolks of raw eggs,

the stiff whites of the egg may be folded in and the mixture baked in one dish or several little ones.

All such combinations are naturally eaten with some form of bread, and here again the whole cost is diminished with an increase of fuel value.

A summary of these possible combinations may be clearer in tabular form, as follows:

	Weight.	Cost.	Cal.
2 eggs	4 oz.	4c.	161
White Sauce:			
1 C. milk	8 oz.	2c.	162
Butter	1 oz.	2c.	217
Flour	1½ oz.		51
Cheese	2 oz.	2c.	246
Ham	2 oz.	2c.	207

It would be interesting to trace the history of egg cooking and find who first discovered that eggs cooked in milk, sweetened and flavored, made the palatable compound we know as custard; or who first discovered the delicious sponge cake or "diet bread," as our foremothers called it.

Sponge
Cake

All our modern recipes for sponge cake, angel cake, lady-fingers, and sponge drops, are but slight variations from the recipes to be found in old cook books, which call for the weight of the eggs in sugar and half the weight of the eggs in flour.

The tendency of the artistic cook is to separate the two parts of the egg, using the yolk to produce certain effects and the white for others.

The proportions are about the same in the angel cake

as in the sponge cake, but the egg whites only are used. The egg yolks, left from such cakes, are more desirable than the whole egg for many custards and sauces, producing a richer and more creamy effect, since the yolk of egg contains considerable oil.

Eggs in doughs may better be studied here with other qualities of eggs rather than later with doughs.

Under this head may be included noodles, popovers, Yorkshire pudding, cream puffs, eclairs, tim-

Eggs in
Doughs



EGG TIMBALES.

bale cases, fritters of many varieties, as well as sponge and angel cakes and macaroons.

From a study of these distinctly egg doughs we may see why eggs are added to muffins, puddings, etc.

These may be divided into three classes: (1) When the egg is used merely to stick flour together, such as noodles and timbale cases. (2) When the cake resulting is to be hollow like popovers and puffs, then the egg is beaten with the other ingredients. (3) Where a spongy texture is desired, the eggs are separated and beaten separately.

Classes of
Egg Doughs

For such mixtures as the first class lightness is not essential, is really undesirable; hence, the eggs are

Noodles

beaten only enough to blend yolk and white, and not to mix air with them. In noodles, which are a kind of egg macaroni, the egg supplies liquid as well as aids in sticking the particles of flour together. After a stiff, smooth dough is made, it is rolled much thinner than would be possible if it did not contain egg. Then it is



Pop Overs—an Example Dough Raised by the Expansion of Air.

cut in strips or fancy shapes and may be cooked at once or dried and used like macaroni.

Timbales

The timbale cases are made from a thin batter, in which, to egg and flour, milk and small quantities of fat and sugar are added, and the whole beaten together until smooth. If the batter is then allowed to stand until the air bubbles escape, the timbale cases will have fewer holes in them. The hot timbale iron is then dipped into the batter and the coating adhering is fried until crisp.

The second class should be hollow, and to secure this result the eggs are beaten without separating yolk and white, or better still, are dropped in with the other ingredients and all beaten together.

Popovers are the result of a very thin batter, usually one cup each of flour and milk, one egg, and a little salt. This is beaten thoroughly together with a Dover

Popovers



SPONGE CAKE.

beater, poured quickly into greased cups, iron or earthen, and baked until thoroughly done. Yorkshire pudding is a similar combination.

Cream puffs have a cooked foundation of water, butter and flour; to this when cool the eggs are added and beaten into it one by one. Because of the scalding of the flour this is a stiff mixture and will keep its shape when dropped on flat pans, and will puff while baking. The same mixture, fried in deep fat, produces a hollow fritter which may be filled like a cream puff.

Cream
Puffs

**Spongy
Mixtures**

For the third class of egg doughs and for meringues and puffy omelets, the whites of eggs are beaten by themselves and mixed with special care into the other ingredients that none of the air which has been entangled may be lost. This air expands when heated, producing the delicate lightness of the meringue, or sponge, or angel cake.

**Beating
Eggs**

The use of a whisk on a platter is the best way of quickly converting the slippery egg white into a frothy, flaky mass, so firm and dry that it may be turned upside down without slipping from the platter.

Egg beaters are not absolutely essential, for the work may be done with a fork in time. The whisks are best for beating whites alone—those with cog wheels for the whole egg or for beating batters.

When yolk and white are mixed, it is impossible to beat in as much air as into the white alone, probably because of the oil contained in the yolk. Even a very little of the yolk will prevent the whites from becoming a stiff froth.

Cooking

Popovers, meringues, and sponge cake, like other articles containing large proportions of egg, require long cooking at moderate heat. When taken from the oven too soon they shrivel out of shape.

It is not wise to make cheap cakes and try to make baking powder take the place of eggs in making the mass light. When eggs are cheap, make good cakes and custards, but when they are high in price, depend upon desserts where they are not required.

FISH, FOWL, AND FLESH.

Two important animal products, milk and eggs, have been studied, and we come now to a consideration of the flesh of animals as food. The cooking of the flesh in any way is a comparatively simple matter once we have mastered a few fundamental laws which are practically the same as in cooking eggs.

The choice of different sections of a creature for different purposes and the decision as to best ways of cooking whatever cut happens to be available, are less simple.

The primitive cook applied heat to his fish, fowl, or section of meat and consumed it when cooked. The modern marketmen first divide and clean, then the chef seasons and applies the heat in different ways to the various portions. One part is naturally tender and ready for immediate cooking, another will be better if kept a week or a month, others will be improved by salting or smoking.

Savages have fewer kinds of food and simpler methods of preparation than civilized man. Because of greater abundance it is a natural tendency in civilization to discard as refuse certain portions formerly eaten. On the other hand, business competition makes it necessary to save all by-products and every portion of an animal is used for some purpose and brings some money return, even though small. Were it not for this, our animal foods would be higher in price

than they are. As it is, they are the most expensive part of the daily food.

Meat a
Secondary
Product

This is partly due to the fact that the flesh of animals is a secondary product. Animals consume grains and require additional human care, and thus must cost more than the grains, themselves, alone. Moreover, it has been learned by dietary studies that average families in the United States obtain from half to two-thirds of the protein in their food from animal source, and the cost of food is usually proportionate to the demand.

Comparative
Composition
of Animal
Food

The composition of all animal foods is similar. Milk is mainly water, but contains some of each of the food principles. Eggs have less water than milk, and no carbohydrates, but furnish larger proportions of fat and protein. Fish would average about the same proportion of protein as eggs, but rather less fat. Poultry yields more protein than eggs, but about the same amount of fat. The flesh of the larger animals will average about two-thirds water, the protein and fat being in varying proportions according to the age and condition of the animal.

Costs of
Meat

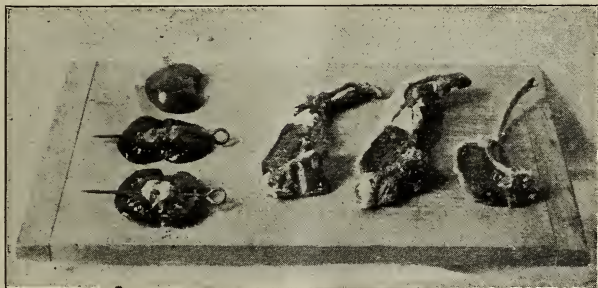
Without regard to the names given by marketmen of different localities to the cuts of meat, we may learn the location of the choicest pieces. Cuts which offer tender muscle or large proportion of muscle will naturally command the higher prices.

In any of these animals the framework of bone is practically the same. The larger portion of bone is

in the forequarter. This is one reason why the forequarters are cheaper than hindquarters in our markets. Consequently, there is less nutritive value per pound and what there is is less accessible, for the meat is not easily carved unless boned before cooking.

Meat of any kind should have little odor when in good condition. It should be firm and dry rather than

Judging
Meat



LAMB CHOPS AND KIDNEYS.

moist, and should be well marbled with fat.

The lower part of the legs will have little muscle in proportion to the bone, and there will be tendons holding the muscle to the bone.

Muscles getting little motion or exercise will be tender, while those which are active will be tough, though juicy. The neck and legs, therefore, will be suitable for broths but not desirable for roasts.

Toughness

A general rule is this: the market value of meat increases backward from the head, but decreases down-

ward toward the legs. This brings the choicest cuts in the back upper part of the creature and includes the rump and loin.

The muscle of good beef is dark red when first cut and grows brighter when exposed to the air for a short time. The fat is yellowish white.

Mutton and lamb have a hard white fat. The flesh of mutton is a duller red than beef. The lamb is pinkish in tinge. The bones of veal and lamb are smaller than those of beef and mutton. Veal and fresh lean pork are somewhat the same shade of dull pink, but the pork has more fat mixed with it.

Meat from young animals is tender but not so nutritious, and does not keep so well as that from older ones.

The heart, liver, sweetbread, kidney, tripe, are also used as food and the same general laws govern the methods of cooking them.

The chef may not recognize the same elements in meat that the chemist does, yet his choice and preparation of a cut of meat are based upon its composition. From this point of view, meat consists of three parts: lean muscle, fat, and bone, and the market value of any cut is based upon its relative proportion of these.

Lean meat is most desired and tender fibres command the higher prices. Some fat is utilized with the meat, but a large part goes to the manufacture of artificial butter, lard, and soap. Much of the bone is

refuse, but some of its substance may be extracted by right treatment.

The lean portion of meats is about one-fifth or twenty per cent. protein about five times as much as in an equal weight of milk.

The muscle or the lean meat may be freed from skin, gristle, bone, and fat, wholly or in part before cooking. It is easier to serve when this is done, and there is no waste at the table, but there may be loss of flavor. Raw meat may be digested readily, but we cook it to make it more attractive in appearance and more appetizing in flavor.

Preparation

Some fat is required to keep the meat from drying during the cooking process. Often the muscle is so closely associated with bone, tendon, and gristle, that to remove them would cause serious loss of juice. In any case, when the tougher portions are removed they should be used for stock and their flavor returned to the muscle as a sauce or used for soup or other good purpose.

**Some Fat
Needed**

Tender muscles may be cooked quickly—steaks and roasts—and should be exposed to intense heat at first.

Tougher portions may be made more palatable by pounding to separate the connective tissue, but this is often accompanied by loss of juice, or they may be put through the meat chopper or cooked slowly for a long time in a gravy, or both.

**Tough
Meat**

By browning tough meat first we give it a good flavor and sear the surface so that more of the juice will

Browning

be retained than if raw meat were used. Some scraps of fat may be browned, an onion sliced and fried in the fat, an equal measure of flour added, and when it is mixed smoothly with the fat, water is put in, in the same proportions as for white sauce. The meat is put in the gravy and left covered on the back of the stove to cook slowly, later vegetables are added.

Braising

Braised meat and pot roasts are similar in effect, but large pieces of meat are used and more time is required. All the trimmings, except the fat, are put with the bones, covered with cold water and the kettle is set on the stove to heat slowly.

Salt Meat

Salt meats should be cooked slowly in plenty of water until tender. When the meat is very salt, it should be put on in cold instead of boiling water.

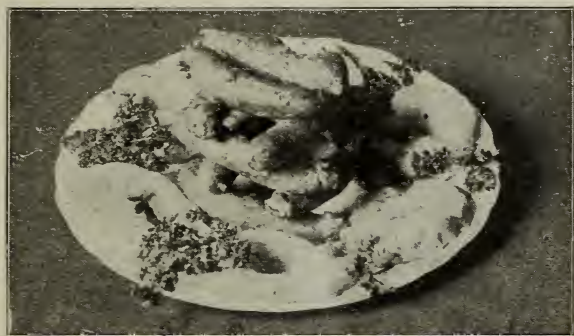
Fatness

Wild animals usually are less fat than those that have been raised for food. Excessive fat may mean disease. Young animals have but little fat compared with older ones. Half the weight of a pig may be fat and a fourth of a fat sheep or ox. Some portions of a creature will contain much more fat than others. Layers of fat occur around the inner organs of animals. Some fish have fat or oil in the liver and little or none elsewhere. Fat mingled with the lean tissues is partly visible, partly detected only by chemical methods.

To a certain extent fat takes the place of water in the tissues. In fat meat the purchaser gets the same amount of protein but buys fat instead of water.

The surplus fat purchased with meats should be turned to good account by clarifying it for shortening or frying. It should be freed from the protein matter as far as possible by trimming and soaking in cold salted water. The water should be changed often, and the fat, after being cut in small pieces, may soak from twelve to twenty-four hours. Then it is drained and

Saving
the Fat



SAUSAGE AND FRIED APPLES.

heated slowly to separate the clear fat from the heavy, honeycomb-like tissues which contain it. At the end of several hours the fat will have melted and may be strained from the crisp brown tissues. If raised to too high a temperature the fat is less wholesome and well flavored.

In the average household, trimmings of beef, pork, veal, lamb, and poultry, may be prepared together for

fry fat, and where much meat is used will keep a supply in the frying kettle.

**Frying in
Deep Fat**

Frying in deep fat is a satisfactory method of securing a crisp, brown crust. When the process is properly conducted very little fat is absorbed by the food.

The temperature of fat suitable for cooking is much higher than that of boiling water and ranges from 300° to 400° F, according to the nature of the article to be cooked. For doughs which should rise, and fish which must be cooked through, a lower temperature and longer time are required than for fishballs or croquettes, already cooked and only to be browned.

If many pieces of cold food are put into the kettle of fat at one time, the temperature will be lowered so much that they may absorb fat and even fall to pieces.

**Testing
Temperature**

A bit of bread dropped into the kettle will brown in one minute if the fat is right for frying doughs, and in less time if it is ready for croquettes.

Fat by itself does not boil, but when moist food is put into it large bubbles of steam begin to form. At first the foods being cold and heavy sink to the bottom of the kettle; as they warm and the water escapes, they rise toward the top.

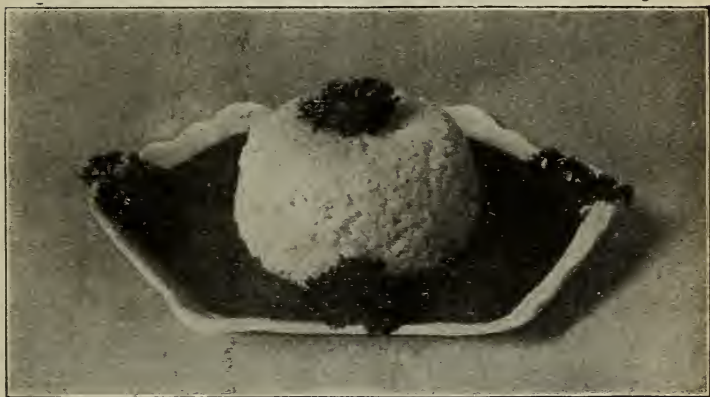
As soon as the food is brown it should be removed from the fat and drained on soft paper before serving.

Bones

The bones of animals yield considerable nutritive material if we use proper methods to extract it. Mar-

row is found in the leg bones but does not contain so much protein matter as the spongy rib bones. When meat is boned before cooking, bits of meat cling to the bone. By soaking in cold water, then cooking gently, a large part of the flavor and nutritive part of the bone is dissolved in the water. Cartilage, gristle

Extracting
Nutriment

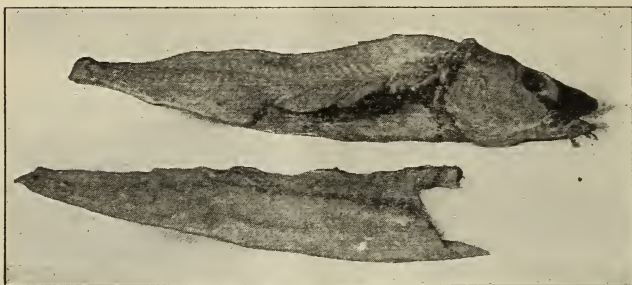


MEAT LOAF IN RICE.

and tendons are also somewhat soluble when exposed to moisture and heat. The smaller the pieces into which bone and meat are divided the greater the surface exposed to the dissolving action of the water. The flavors of meat which are drawn into the water are known as extractives and are stimulating rather than nourishing.

**Soup
Stock**

This process of extraction from portions unsuitable to eat is known as making soup stock. Bouillon and beef tea are made from tough lean meat with little



FILLET CUT FROM SIDE OF FISH.

or no bone. Consommé is made from meat and poultry together. Anything that would give a strong flavor must be removed. The skin of lamb or beef should be thrown away.

**Names
of Soups**

The flavoring of the soup or the garnish served in it gives its distinctive name. All meat, poultry, and fish soups have as their basis a stock made from the portions undesirable to use in any other way.

Yet stock contains but a small proportion of the nutriment of the meat, and fibre of the meat from which stock has been made may be used for hashes, with herbs, etc., to give flavor.

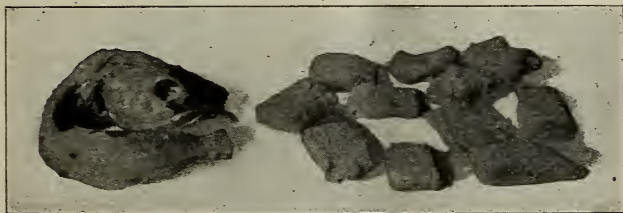
FISH.

Fresh fish have full lifelike eyes, red gills, silvery, not slimy skin and scales, firm tail, not flabby and drooping, and firm flesh. Plump short fish are better than long thin ones of the same variety. The time of their transfer from the water to the table should be as short as possible. While fish as a whole is not so nutritious as meat, it may often take the place of meat on our tables. It is the province of the cook to supplement the fish with such sauces as will supply both flavor and nutriment.

Proper
Appearance

In general, the methods of cooking fish are the same as those followed in cooking meats. The flesh should be thoroughly cooked, but not overdone. Oily fish, like

Methods
of Cooking



PREPARATION OF FISH.

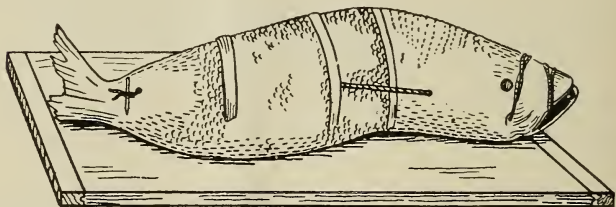
For Fish Stock.

Ready to Fry.

salmon and mackerel, are best broiled. Almost any fish may be baked whole or in fillets. Boiling is an extravagant method of cooking unless the water is used for a soup or a sauce. Steaming is better than

boiling, as more of the flavor is retained in the fish. Frying in salt pork fat is a desirable way to cook fish lacking flavor or fat, but for uniformity in cooking the kettle of deep fat is to be preferred to the thin layer in a shallow pan.

If a fish lacking in fat is brushed over with oil or melted butter and broiled under gas, the result gives the best effects of frying without the disagreeable odors.



FISH STUFFED AND TRUSSED FOR BAKING.

Fish stock may be kept for several days if convenient, or it may be used as the basis of a sauce to serve with the fillets of the flesh.

**Sauces
with Fish**

Since so many varieties of fish lack fat, rich sauces are generally considered a necessary accompaniment. The composition of the fish and the way in which it is cooked should decide the kind of sauce to be served with it. Acids like lemon juice, pickles, and tomato are often agreeable additions to a fish sauce.

POULTRY

Judging

Young birds are to be chosen for broiling and other quick cooking, but full grown fowls are more nutritious for broths and stews. A fowl is usually fatter than a chicken, the skin is tougher, and the bones—especially the tip of the breast bone—are harder. In the skin of the young bird there are usually pinfeathers, the feet are smoother, and the muscles or flesh are less well developed than in the fowl.

Preparing
Fowl for
Fricassee

To prepare poultry, pick out pinfeathers, singe and rub off the hairs and wipe clean. Cut through the loose skin on the back, pull away from the neck, take out the crop and windpipe in front, cut off the neck.

Cut through the skin on the legs about an inch below the joint, break the bone, twist the leg and pull out the tendons one by one. Take off the wings and cut through the loose skin on the sides and separate the leg and thigh joints.

From the backbone to the tail, cut through the thin muscles on either side. This exposes the interior organs so that it is easy to learn their relative positions. Then one knows how to proceed when preparing a bird to roast when the opening is small.

Loosen the membranes which attach these organs to the body, following the breastbone with the fingers until the point of the heart is felt. Then remove heart, liver, and gizzard together. The gallbag is protected by the liver, so there is little danger of breaking it if



A FOWL CUT UP FOR FICASSEE.

they are not separated. The intestines should be removed when the fowls are dressed for market.

Next detach the lungs from the backbone near the wings, and the kidneys, which are lower down in the back. These are not used.

Separate the gallbag from the liver without breaking, and cut away any portions of the liver which are tinged with green. Cut across the larger end of the heart and slip it out of the membrane enclosing it. Cut through the gizzard on the wide side and take out the inner portion without breaking, if possible.

Learn the order of removal of these portions from the body, and then nothing will be forgotten when preparing a bird for any purpose,—the crop and windpipe from the neck.

Order of
Removal

The heart, liver, and gizzard, together, from an opening near the tail.

The lungs and kidneys from the hollows in the backbone.

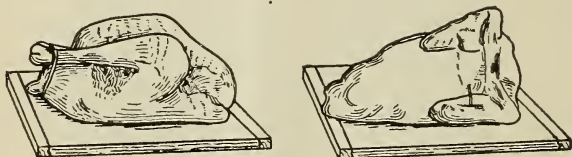
The oil bag on the upper part of the tail.

The backbone can now be divided near the middle, and by slipping a knife under the sharp end of the shoulder blade and then cutting through the ribs from the point where the wings come off, the upper part of the back is separated from the breast.

If desired, the fillets of white flesh can be separated from the breastbone and wishbone by running the knife close to the bones.

Never soak a fowl in water, as is often the practice. If any parts need washing rinse them off quickly one by one.

The breastbone, upper part of back and neck, and sharp ends of wings should be put in cold water and



CHICKEN STUFFED AND TRUSSED FOR ROASTING.

heated slowly ; thus more flavor is extracted from these portions which have but little meat.

When the water is boiling hot the other sections are put in and the hot water coagulates the juices on the outside and thus more flavor is retained. To accomplish the same end, the joints are often browned in hot fat and then are stewed afterward,

Put in
Boiling
Water

VEGETABLES AND GRAINS.

Like the foods already studied, vegetables are mainly water, but all the five food principles may be obtained from the vegetable kingdom. Here we secure our supplies of starch and sugar, or the carbohydrates, but the proportions of proteid and fat are, as a whole, smaller than in the animal foods. From fruits, vegetables, and grains we obtain mineral substances valuable for making bones and teeth and keeping the whole system in good condition.

The woody fibre or cellulose, abundant in vegetable structures, is the great obstacle to be overcome by cooking. Plants growing rapidly with plenty of water and sunshine usually have less of this fibre, and it is the aim of the gardener to eliminate it as far as possible. By improved methods of cultivation the agriculturist has removed the acrid flavors of the natural vegetables and has reduced the proportion of woody fibre.

Softening
Cellulose

The cell walls cannot be separated wholly from the nutritive substances they contain, and unless softened by cooking may irritate the alimentary canal so that the whole is hurried through before digestion is completed. Cellulose, though of little food value, may aid digestion by providing the necessary bulk for its mechanical processes.

Experiment. To get a clear idea of the structure and composition of vegetables, grate a portion of a

potato or turnip. Let the pulp fall from the grater into a strainer placed over a glass and press out all the watery juice possible. Some of the starch of the potato will settle from the juice, and more may be washed out of the mass remaining in the strainer. The presence of sugar in the juice of a carrot may be recognized by tasting it after evaporation.

By examination of the woody fiber left in the strainer we see how closely it is connected with the starch and sugar, how impossible it would be to separate it, and the necessity for softening it that we may be able to digest the nutrients.

We discard portions of vegetable foods, the pods, husks, cobs, etc., because of our inability to cook them so they can be digested.

Chopping and straining aid the cook in dividing the cellulose so that the particles are less irritating and the nutrients are more accessible.

Parts of
Plants Used
for Food

It is interesting to note the different parts of plants which are used for food—the roots, tubers or bulbs, stems, leaves, fruits, and seeds. The last are used mainly in the dry form, and absorb much water in preparation. This must be remembered when studying analyses of dried legumes and cereals.

The botanical grouping of plants is helpful. Once we have learned how to prepare and cook one member of a plant family we have something to guide us with its relatives. Among the principal classes to study in

this way are the pulses, the grains, and the cabbage family.

There are many kinds of each vegetable offered by the seedsmen. Moreover, any vegetable differs materially in different years and at different seasons of the year.

From the standpoint of the cook a convenient classification of vegetables may be made according to the general preparation, the time, and the amount of water required for cooking them.

Dried vegetables must have abundant water supplied and must be allowed time to soak, thus absorbing an amount of water similar to that lost in the drying process. There is little difference aside from the fat added in cooking, in the analysis of the dry bean which has been soaked and baked, and that of the green shelled bean. Sometimes we try to hasten this process of absorption by heat, but the best results are attained when dried fruits or vegetables are soaked until at least double in size before cooking.

**Dried
Vegetables**

Old or strongly flavored vegetables, such as potatoes, turnips, and onions, will be improved by the removal of the skin and any imperfections before cooking, and by soaking in cold water for an hour or two. Inferior onions may be scalded in soda water before cooking, and by changing the water once or twice during the cooking process will be rendered less strong in flavor. It is wiser to make the vegetable palatable

**Strongly
Flavored
Vegetables**



SALAD PLANTS.-Cucumber, Parsley, Radishes, Cabbage, Lettuce.

at the risk of some loss of nutriment than to retain everything and have it uneatable.

Young vegetables in summer and those having sugary juices, like squash and beets, should be cooked in little water or by steaming or baking, so that all their sweetness may be retained, unless the water is reserved for soup or used in a sauce for the vegetable itself.

Young
Vegetables

Slightly wilted vegetables may be improved by washing and soaking or by wrapping in a damp cloth and placing in the refrigerator or by hanging in a draft of air.

Wilted
Vegetables

The pulses or leguminous plants include the bean, lentil, pea, and peanut.

Pulses

In the bean we have an example of a vegetable which differs much at different stages of growth. We may use the pods before the seeds they contain have reached their normal size, the full grown seeds may be cooked green, or dry after first being soaked.

This class of plants is of great value where people must be fed at small expense. They are staples in China, Japan, Southern Europe and Mexico, are invaluable in prisons, charitable institutions, and for the pioneer or logger. Because they lack fat, cream, butter, or pork are added before eating.

Some varieties like the Japanese soy beans, contain as much as sixteen per cent of fat, and peanuts are more than one-third, or about forty per cent fat.

Fat
Contents

Digestibility

Though rich in nutrients this class of vegetables appears to be slow of digestion. The ease and completeness of digestion are aided by thorough cooking and by removing the skins, grinding, mashing, or straining. Long, gentle cooking develops new flavors and removes the peculiar granular texture present in beans and peas insufficiently cooked, even after straining.



Black Bean Soup Garnished with Lemon and Parsley.

The main object in cooking beans, like all vegetables, is to soften the tough fibres of the pods of the string beans and the skins and cellulose of the dry ones.

Peas

Split peas have the skins removed and thus are more readily digested. The skins of the larger beans may be rubbed off after soaking and parboiling.

Hard water retards the cooking of beans and a bit of soda is often added to soften the water and loosen

the skin—this water is poured off when the beans are partly cooked.

Few people use the variety of beans they might, as the black beans for soup, the limas or red kidney for stewed beans, the pea bean and yellow eye for baking and the French flageolets for salads.

Beans

Potatoes are generally liked because of their lack of pronounced flavor, and for the same reason, may be combined with many other foods.

Potatoes

A peck of potatoes may cost from fifteen to seventy-five cents, according to the season of the year, and the abundance of the crop. This quantity will weigh fifteen pounds and will average from fifty to sixty potatoes. That is, one pound will be about four potatoes of medium size, and will cost from one to five cents.

If pared before cooking and all bad places removed, average potatoes will lose from twenty to twenty-five per cent, or one of the four potatoes in a pound. From selected potatoes the government experts scraped the skins, removing as little flesh of the potato as possible. This was about eleven per cent of the weight. In potatoes as usually purchased, the green ends, decayed places, and the potatoes gashed with the hoe easily bring the total loss up to the higher percentage.

Loss in
Preparing

It may be a profitable loss to pare old and inferior potatoes before cooking. The main point to notice in the cooking of the potato is to let out the steam, or to

pour off the water as soon as the fibre and starch are softened.

Potatoes
with Meat

Because the potato is lacking in protein and fat, the instinct of man has taught him to eat it with meat, since it gave him the food principles the meat lacked, and also the bulk desirable for the process of digestion.

The art of the cook has devised many methods of combining butter, oil, milk and eggs with the potato and other vegetables to supply protein and fat. The fried potato absorbs fat while cooking; the white sauce of creamed potato adds both fat and protein; a potato soup is creamed potato with more milk; the potato croquette contains egg and is cooked in fat; a potato salad has oil and often eggs.

Such additions, though increasing the cost of the food, make the result equivalent to vegetables with a moderate allowance of meat. Hence vegetable soufflés, or croquettes, may be served when the meat supply is limited.

Combinations

Almost any vegetable, by due combination with milk, butter, and eggs may appear as soup, fritters, croquettes, soufflés, or salads. For these complicated dishes, it is essential that the vegetable first shall be perfectly cooked in a simple fashion.

Cooking
Vegetables

The methods of cookery applied to vegetables are similar to those used for meat, but must be adapted to the composition and condition of the individual specimen.

It is impossible to give the exact time for cooking any variety of vegetable, for every sample will differ. They are unpalatable when underdone and also at the other extreme.

There is usually some way of cooking best for each vegetable, but if one kind only is available it is necessary to serve it in a variety of ways. This, perhaps, explains why the average cook book gives more recipes for the potato than for all other vegetables. Suitable utensils are essential; vegetables should not be cooked in iron kettles when others are attainable; strainers, mashers, cutters, ricers and presses are desirable.

Strong flavors frequently are due to careless preparation. Careful trimming and thorough washing are essential. Wilted vegetables are improved, as has been said, by soaking. Salad plants need especial care in washing to remove parasites and insecticides.

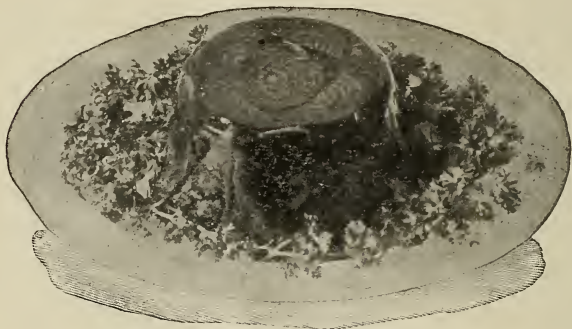
Preparation

Any portion of a root or tuber grown above ground becomes green and strong flavored and will impart its flavor to other portions with which it may be cooked. A decayed bit, or the scorching where the water evaporates, may often ruin the flavor of all.

Young, tender, well flavored vegetables should be cooked and served in the simplest manner. Inferior specimens, like tough asparagus or celery which has lost its crispness, by boiling, straining, and flavoring may be made into palatable soup when they would be worthless under simple treatment.

Vegetable
Soups

Vegetable soups are of two types;—for one, the vegetables are cooked till tender, cut in convenient bits and added to a meat stock. For the other, by long cooking in water a single vegetable or several together are made into stock, and all that is soft enough is rubbed through a strainer and then put with about an equal quantity, according to the strength of each, of



TOMATO JELLY WITH BEETS.

meat stock or thin white sauce. Thick, pulpy stock, like that from peas, beans, or potatoes, needs a much thinner sauce than would celery or asparagus. Unless some thickening of flour is used, the solidier portions will settle, leaving the soup watery on top.

Preparation
and
Digestibility

In one of the publications of the United States Department of Agriculture the difference in digestibility of the same food cooked in various ways is thus stated: Whole peas soaked and cooked, 60 per cent digested;

peas cooked a long time and strained, 82.5 per cent; pea flour cooked with milk, butter and eggs, 92 per cent. This would seem to prove that the portion of vegetable food considered undigestible can be reduced by right methods of cooking.

Mashing is a form of preparation suited to squash, turnip, parsnip, and potatoes. A seasoning of cream,

Mashing



INDIVIDUAL APPLE AND CELERY SALAD.

or butter, and salt and pepper, is usually added. Fritters and croquettes usually have mashed vegetables as their foundation, or small bits are mixed with a thick cream sauce.

The white sauce is a useful addition to vegetables since it increases their nutritive value and modifies strong flavors. Almost any cooked vegetables may thus be "creamed" or "scaloped" by adding both the sauce and buttered crumbs and baking. This is an excellent way to reheat something left from a previous day.

**Creamed
Vegetables**

Salads

Salad is a term belonging especially to a class of uncooked vegetables and in all cases implies a vegetable foundation though meats or fish may be added. The dressing of oil and vinegar is likewise of vegetable origin.

Here is another of our attempts to bring together the five food principles in a single compound. Water and mineral matter, protein, fat, and carbohydrate are usually blended in fairly balanced proportions. This is especially true of salads containing eggs, fish, or meat and eaten with bread.

GRAINS

The grains or cereals are the main dependence of the human race for food and have been known from very early times. Some member of this family of plants is found in every section of the world. Rice, wheat and corn are most largely used as food, while oats, rye, barley, and millet follow closely. Animals can eat these grains or grasses as they grow. For the human stomach the coarser portions must be removed. All are similar in composition, being from two-thirds to three-fourths starch. The protein ranges from 7 to 15 per cent; fat varies from 1 to 10 per cent; there is about 1 per cent mineral matter and 10 to 12 per cent of water.

**Addition
of Water**

Before we can eat and digest such foods a large amount of water must be combined with them. Analyses have shown that the percentage of water in mushes,

boiled rice, macaroni, and mashed potato is nearly the same.

When we buy cereals in paper packages we pay a little more for them than when they are bought in bulk, but that is a convenient, clean form in which to keep them. All cereals should be looked over before cooking since they are liable to attacks from insects.



A Cup of Corn Meal, and the Amount of Mush It Will Make.

To make mushes start with the desired proportion of liquid, as that regulates the final amount. If too much water is used it can seldom be drained off, as it might be from potatoes, and if there is too little at the beginning it is practically impossible to add more without making the mush lumpy and pasty. A double boiler, a dish set in a steamer or a covered pail in a kettle of water, are the utensils suitable for cooking mushes.

Mushes

**Cooking
Cereals**

The coarser the grain, the more water required, and the longer will be the time of cooking. Whole grains are improved by soaking in cold water, finely ground preparations must be mixed with cold water to prevent the formation of lumps. All others should be put into boiling water. Add one teaspoonful of salt to each quart of water. Ordinary oatmeal and granulated wheat need four times their bulk of water, cracked wheat and hominy require more. The rolled grains require but twice their bulk of water.

The cooking at first should be rapid and the upper part of the double boiler should be placed directly on the stove for five minutes. Then put it over the other part, cook closely covered and do not stir. Such foods are not injured by cooking for a longer time than the usual directions allow. Coarse hominy, oatmeal, or cracked wheat for breakfast should be cooked several hours the previous day.

Rice

Rice may be boiled in a quantity of water which is afterwards drained off, but this is wasteful unless some use is made of the liquid.

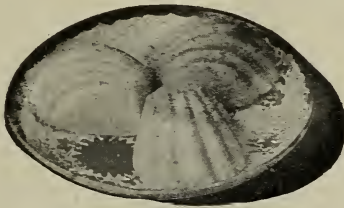
Macaroni and tapioca are not strictly cereals but conform to the same rules of cooking.

**Fried
Mush**

Most mushes or cooked cereals may be moulded and served cold for variety, especially in warm weather, or be packed smoothly in oblong pans or round tin boxes and when cold sliced and fried to serve with syrups or to eat with meats.

A portion of cooked cereal may be added to the liquid used in mixing muffins.

Manufacturers of the present day seem to be trying to see in how many different forms they can prepare the few standard grains; they are left whole, are cracked, are crushed into flakes, or broken into granules. As the result of this variety of preparations and



Cereals shaped in Fancy Moulds.

the generous way in which they are advertised cereals are used more and more.

During the last few years they have been cooked in the factories and prepared in forms ready for immediate use. These forms have many merits though not all that are claimed for them. In some respects they resemble the primitive forms of unleavened bread which were the first attempts among all races, the bannock, the hoe cake, the tortilla.

"Ready
to Eat"
Cereals

TEST QUESTIONS.

PRINCIPLES OF COOKERY.

PART II.

Read Carefully. Place your name and address on the first sheet of the test. Use a light grade of paper and write on one side of the sheet only. *Do not copy answers from the lesson paper.* Use your own words, so that the instructor may know that you understand the subject. Read the lesson paper a number of times before attempting to answer the questions.

1. In what ways are eggs used in cookery?
2. What substances are naturally combined with eggs and milk, and why?
3. What is the fundamental principle in cooking articles containing a large proportion of egg?
4. Mention five dishes where egg is an essential ingredient, and five others where it may be used or omitted. Explain why.
5. If we find it necessary to reduce the number of eggs in a cake or custard, what other changes would be necessary?
6. Make a two days' menu for the season when eggs are at the lowest price, and another for the season when they are expensive.
7. Which forms of animal food are the most expensive and why?
Which most economical and why?
8. What portions of meat are best for soup stock? What should be discarded? Describe the process of making soup. Has the extracted meat nutritive value?

PRINCIPLES OF COOKERY.

9. Why is less fat absorbed by food in frying in deep fat than in sautering?
10. Give methods of preparing tough meat so that it is palatable and nutritious.
11. Give the names of soups which have (a) little, (b) much, and (c) great nutritive value.
12. Why do we add stuffing and sauce to meats and fish?
13. What is the greatest obstacle to be overcome in cooking vegetables?
14. Give methods for cooking fish. What is the proper appearance of a fresh fish?
15. Plan a rotation of different cereals for five breakfasts in winter and five in summer, giving reasons for your choice.
16. How may different methods of preparing a vegetable change its nutritive value?
17. Describe your own method of roasting meat.
18. Give the names of the vegetables and grains used in your household. Name some that are not used.
19. Is there any question you wish to ask or subject you would like to discuss relating to this lesson?

NOTE.—After completing the test, sign your full name.

Principles *of* Cookery

PART III

LESSON PAPER

PREPARED BY

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LECTURER SIMMONS COLLEGE

1904

American School of Household Economics

CHICAGO, ILLINOIS, U. S. A.

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AMERICAN SCHOOL OF HOUSEHOLD ECONOMICS

PRINCIPLES OF COOKERY

PART III

BREAD AND OTHER DOUGHS

Having considered the whole grains we must learn how to use them when ground into flour. Although some forms of bread like hoe cake and tortillas can be made from cracked grain without making it into a flour, most people depend upon flour for a large part of their daily food.

Order of
Mixing
Ingredients

In the best cook books the ingredients are mentioned in the order in which they are to be put together to secure the best results and to save dishes; the dry cups and spoons are used for the flour and spices, then for the shortening and liquids. The flour is sifted before measuring and sifted again to mix the other materials with it.

There is such variation in flours that it is impossible to give exact recipes for doughs, but it is easy to learn certain general proportions and experience must teach the rest. A simple formula will be helpful in interpreting old recipes in which the exact quantities of flour or liquid are not stated, or in analyzing recipes to decide whether they are doughs or batters.

General
Proportions
in Doughs

One measure of flour to one of liquid makes a batter.

Two measures of flour to one of liquid gives the usual muffin mixture.

Three measures of flour to one of liquid makes a soft dough, but one that may be kneaded.

Four measures of flour to one of liquid is the usual proportion for doughs to be rolled thin like pastry or cookies.

Batters and muffins can be stirred with a spoon. Doughs are mixed more thoroughly and easily with a knife.

Doughs are made light because thus they are more palatable and digestible.

Making
Doughs
Light

The almost endless variety of breads, cake, and pastry may be classified according to the means used to make them light. Yeast has been known to the human race from a very early period, the others are much later inventions.

The principal means are these:

The mechanical introduction of air, as by beating or by the addition of eggs or by the folding of pastry, or in the aerated or Daughlish bread.

The use of yeast, the growth of a plant filling the dough with gas.

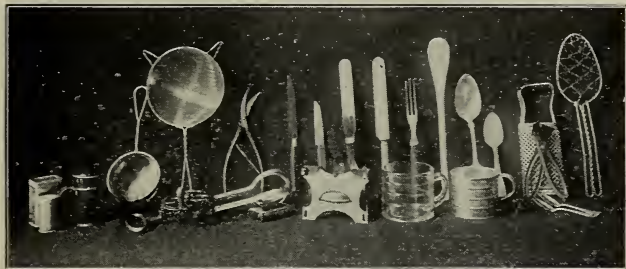
The chemical combination of a bi-carbonate of soda, with some acid substance.

Yeast

For practical use in every-day life it is essential to remember that yeast must be treated like other forms of plant life and if we want it to grow, we must provide the right kind of soil, sufficient moisture, and suitable temperature. After its work is done, the vitality of the yeast must be destroyed by heat.

It may be desirable to know how to manufacture yeast at home and how to utilize the dried yeast cakes in emergencies, though compressed yeast cakes are now so generally used that it is hardly necessary. A compressed yeast cake should be firm and solid, not soft and pasty; it should look something like fresh cheese, not dark colored and moldy. When only part of a

Yeast
Cakes



USEFUL UTENSILS.

yeast cake is to be used, it should be cut off squarely and the remainder wrapped smoothly in tin foil again, when it may be kept a few days longer.

BREAD

The essential ingredients in bread making are yeast, liquid, and flour; the proportions may be varied according to conditons.

Sugar and shortening are commonly used, but if they were omitted wholly it would be possible to have palatable, nutritious bread. Salt is essential to suit the taste of most persons, but as bread is usually combined

with salted butter its absence would be less noticeable, and bread might be made without it. Fermentation is hindered by the presence of salt, a small amount of sugar hastens the process.

Causes of
Slow Rising

Sugar in large quantities makes the dough dense and the yeast cannot expand so readily. An excess of shortening has much the same effect. If a dough is made stiff with flour it rises more slowly. A stiff dough usually has small air cells and is finer grained than when the dough is made softer.

The liquid may be milk, whole or skimmed, or water, or half of each. The milk supplies some sugar, fat and nitrogenous matter and produces a more nourishing loaf than that which is made with water. Mashed potatoes or sifted squash or cooked cereals are sometimes added to a bread dough for variety, but the process is not changed by such additions.

Kinds of
Flour

The best bread flour is made from spring wheat and pastry flour from winter wheat, though they may be used interchangeably if necessary. The spring wheat flour contains more gluten and less starch, so that less of the bread flour is required to produce a dough of a given consistency.

The entire or whole wheat flours provide more bone making materials than white flour, otherwise there is little difference in the nutritive value of the better grades of each.

The presence of gluten makes wheat the favorite flour for yeast dough. Gluten is adhesive when moist-

ened and thus retains the gas bubbles formed by the yeast in somewhat the same way that egg-whites hold air when they are beaten.

Old recipes for mixing yeast bread usually give directions for rubbing shortening into the flour and then

Order of
Mixing



"BREAD CAKE" OR BUN BREAD.

adding the other ingredients with liquid to make a dough that can be kneaded. The best authorities to-day reverse the order, thus saving time and energy and producing a better result.

The liquid is warmed that the fat, sugar, and salt may readily blend with the other ingredients and that the dough may rise more rapidly. When it is below 100 F, or cool enough to avoid cooking the yeast, that

Liquid
Warmed

is added and well mixed through the liquid. Sufficient flour then is mixed in to give the desired consistency for kneading.

At first the mixture may be stirred with a spoon, but as it becomes stiffer a knife will more easily serve to produce a smooth dough.

Double
Process
Bread

The process of mixing bread may illustrate the batter and drop batter or muffin mixture as well as the dough. To make a sponge, half the quantity of flour to be used is mixed with the liquid and this allowed to rise till foamy, when the remainder of the flour is added. The advantages of this double process are that a trifle less flour is required since the first has time to expand before the second is put in, and that the process is somewhat shortened because in the first stage there is less resistance for the yeast to overcome and the whole sponge becomes full of yeast for the second stage.

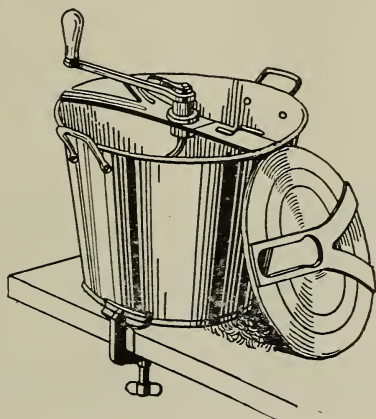
Amount
of Yeast

Sometimes it is more convenient to use a small portion of yeast and allow the dough to rise for a longer time, and again to use more yeast and thus do the work more quickly. Until the scientists decide which is really the better method, the housekeeper will find it desirable to vary the quantity of yeast according to her conditions. Time, temperature, and quantity of yeast must be considered,—if one must be diminished, the others should be increased.

Short
Process

For common use, a short process is to be preferred to the old custom of letting the dough rise over night.

When it rises by day we can regulate the temperature and stop the process at the right time. One yeast cake to one pint of liquid and about three pints of flour, will make two medium-sized loaves of bread, which can be completed inside of six hours.



BREAD MAKING MACHINE.

When necessary, a dough well risen and ready to shape may be cut down and put in a refrigerator or other cold place and thus held in check for several hours without injury. Sometimes half the bread may be shaped in a loaf and the remainder in rolls and the pans containing the latter set away in a cool place for several hours before baking that they may be hot for a later meal.

Holding
Dough
in Check

When first mixed, dough is kneaded just enough to blend all ingredients, then it is put back in the bowl,

Rising

brushed over with water or with melted fat and covered while it is rising. Such precautions aid in preventing the formation of a dry crust caused by the evaporation of the water on the surface during the process of rising. The bowl containing the dough may be set in a pan of warm water which is changed often enough to keep the temperature even. When the dough must stand over night in a cool kitchen, the bowl may be wrapped in a blanket to prevent the escape of heat.

Kneading

Much time is doubtless wasted in kneading doughs, though it seems to be agreed that this process works all ingredients together and thus give a better texture to the bread. To knead work the edges of the dough little by little toward the center, pull it over, press down into the mass and press it away with one hand while turning the whole around with the other. When the dough is smooth, elastic, and rises quickly when pressed and does not stick to the hand then it is done.

After the dough is double in bulk it should be kneaded enough to redistribute the air bubbles which have run together and formed larger ones, and to shape it for baking. At this stage no flour should be added, for here much time would be required to work in a little flour, and that is why long kneading has been thought necessary. Dip the fingers in soft fat if the dough inclines to stick, as one would do when pulling candy.

Shaping

To shape biscuits or rolls, first make smooth round

balls, then by gentle rolling and pressure make the finger rolls—then farther extend till the strips can be twisted or left as sticks for soup. Thus one form may be developed from another.

When rolls are to be cut out and folded, the pressure of the rolling pin will equalize the air bubbles without previous kneading. Instead of making the dough for rolls rich with butter or lard, it is wiser to brush over the outside of the rolls with melted fat when they are put in the pan.



BUNS—SEPARATE AND IN LOAF.

Again the dough must be allowed to double in bulk and then it is ready to bake.

To summarize the points already covered.—The time required depends upon the quantity of yeast used, and the temperature at which the dough is kept. One measure of liquid to three of flour is the usual proportion. For fancy breads make a sponge first, and let the mixture rise three times. Large quantities of sugar and butter tend to retard the growth of the yeast plant. For bread add all the flour at once. Small shapes are

Summary

preferable to large ones, as thus more thorough cooking is insured.

**Baking
of Bread**

The baking of bread is not easily disposed of in a few words. Yeast doughs having risen before being put in the oven will bear rather a higher degree of heat at first than other doughs. A more moderate oven is required for loaves than for rolls that the heat may penetrate evenly, but the loaf must remain a sufficient time to raise the center to a degree of heat that will insure the destruction of the yeast. A moderate temperature might allow the dough to continue rising and even to sour from the growth of bacteria when in the oven.

When thoroughly baked, a loaf of bread will seem light and hollow and no steam will come from it to burn the hand as it is turned from the pan.

The usual temperature for baking bread is about 400° F, though a good result may be reached by a more moderate heat continued for a longer time.

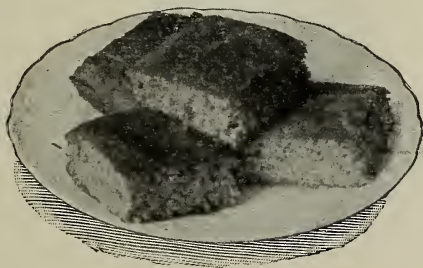
**Cooking Soda
with Acids**

Experiment. Three or four glass tubes or common tumblers are all the apparatus needed for some practical experiments which will make the use of these leavening agents much clearer than does the ordinary cookbook. Dissolve some soda in half a tumbler of water; in another tumbler dissolve some cream of tartar, in a third have a little molasses; in a fourth place some sour milk, and in a fifth some vinegar.

Now put a part of the soda water into each of the other glasses, stir well, and watch the result. Leave

these till later to see how soon the gas escapes and that it cannot be revived. By tasting soda and cream of tartar we shall see that it is desirable to combine them in such proportions that each may neutralize the other. This is done in baking powders.

In another glass dissolve some baking powder, first in cold and then in warm water to show that the gas escapes more rapidly at a high temperature.



CORN BREAD.

These experiments show us why we should sift cream of tartar and soda or baking powder with the flour instead of dissolving it in liquid. The gas which is to make the dough light begins to escape from the soda when it comes in contact with an acid liquid.

Some baking powder manufacturers try to convince us that their product is so perfect that it is useless for the housekeeper to continue to keep soda and cream of tartar in her store closet. But much as we owe to their perfect methods of grinding and sifting and combining

Soda and
Cream of
Tartar

these substances in the right proportions, there are times when we must use them separately.

Angel cake, for example, requires the addition of cream of tartar to stiffen the egg-white which is its foundation. This aids in holding up the spongy mass until it is made firm by heat. In any case where there is a large proportion of egg-white a slight excess of cream of tartar is desirable.

**Molasses
and Soda**

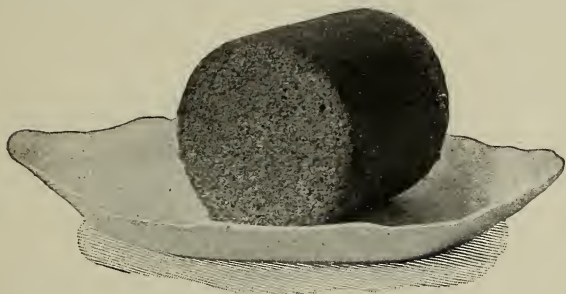
That molasses is acid in spite of its sweetness is evident by testing it with a bit of soda. For this reason soda is added to molasses candy since if it is filled with air bubbles it will be more brittle. The acidity varies in different grades of molasses, and modern methods of manufacture and quick transportation give us a less acid product than that of the past. This explains why many of the recipes of our great-grandmothers called for such large quantities of soda in gingerbread, etc. In such recipes it is usually wise to reduce the quantity of soda and use a small amount of baking powder. Brown bread and all cakes and puddings containing molasses, because of its acidity, are usually more palatable if some soda is used to make them light instead of baking powder only.

Butter contains so much buttermilk that, unless it is washed before using, a bit of soda is essential for all rich cakes and cookies which are to be kept for any length of time.

**Sour Milk
and Soda**

Because of the tendency to use an excess of soda with it, the use of sour milk has been condemned. But

thick, sour milk is not very variable in acidity, and the use of one even teaspoonful of soda with each pint of sour milk is safe. Soda is inexpensive and sour milk is also, while cream of tartar and baking powder are costly. One half level teaspoon of soda is usually enough when one cup of molasses is used, as it is with one cup of sour milk. When it is more convenient to



BOSTON BROWN BREAD.

substitute sweet milk for sour, we retain the soda and add one slightly rounding teaspoonful of cream of tartar.

Baking powder contains some starch, but two or three level teaspoonfuls of baking powder are equal in effect to one rounding teaspoonful of cream of tartar and the half level teaspoonful of soda.

Just why some good old recipes recommend dissolving soda in hot water before adding it to the other ingredients, or mixing it with hot molasses, is uncertain. Perhaps the housewives wanted to "see with

Strength of
Baking
Powder

their eyes" that action would result. Or the habit might have been the result of the impure quality of the alkaline substance. The "pearl ash," as saleratus was called, was not as finely pulverized as is the soda of today, and may not have been as thoroughly purified from other ash. Hot water would dissolve it quickly, any impurities would settle, and even if some gas escaped enough was left to do the work of puffing up the dough.

Mixing
Baking
Powder

Such small quantities relatively of soda, cream of tartar, and baking powder are used in a dough that it has been a question how they should be mixed with the other ingredients to secure the most perfect result. The dough should be light throughout, not here a solid streak, and there large bubbles.

Some teachers of cookery have recommended sifting the one or two teaspoonfuls of baking powder over a cake after it was mixed and beating thoroughly just before pouring into the pan in which it is to be baked. But as soon as the powder comes in contact with the moist surface of the dough some gas will be lost, and moreover, it is doubtful whether two teaspoonfuls of baking powder can be evenly mixed through a quart of cake batter without much beating which does not improve the quality of the cake at that stage and delays the baking.

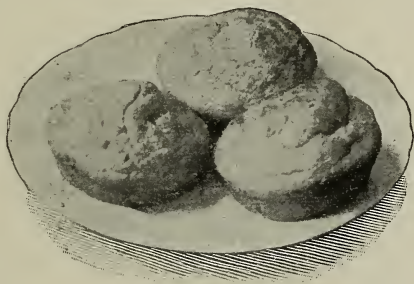
The accepted plan at present is to sift with the flour the baking powder or cream of tartar and soda or the

soda alone when it is to be used with some sour milk or molasses.

The sooner the process is completed after the acid and soda meet each other the better. Therefore we keep all the materials dry until the last moment, then mix quickly and bake at once.

Similar recipes are found in all cook books, and once the general proportions and the office of each ingre-

General
Directions



RYE MUFFINS.

dient are learned, it is easy to make many variations. The process of mixing is practically the same in all cases. Prepare the fire and dishes for cooking, before mixing any of the ingredients measure everything, sift all dry materials together, add liquids, mix all thoroughly, and cook immediately.

Changes in the proportions of materials often lead to a change in the manner of mixing them. For example, when a small quantity of shortening is used in batters, it may be melted and beaten in, but if a large

Manner
of Mixing

proportion is required, it should be rubbed till creamy and blended with the sugar as for cake, or mixed into the flour as in pastry making. For stiff doughs which are to be rolled, it is essential that the fat should be put in cold since even a small quantity, if warm, will tend to make the dough soft and sticky. We grease pans, griddles, etc., because fat prevents adhesion; in the same way fat in a dough keeps the particles separate and makes it break apart readily, so that we call it "short" or "tender." Hence shortening is any form of fat that will accomplish such a result. To give like results, more shortening is required with bread flour high in gluten than with pastry flour low in gluten.

"Shortening"

Eggs in doughs, as in other cases, have the quality of making particles hold together, just the reverse of shortening. Any dough containing much egg will be elastic and spongy, and if cooked too quickly will be tough. Doughs to be made rich with butter, like pound cake, may be saved from heaviness by the use of eggs.

PASTRY AND CAKE

Shortcake and pastry are illustrations of the use of much fat in doughs and the result is brittle and tender. Success in pastry-making depends more upon keeping the ingredients cold and handling the dough deftly than any special formula or order of mixing. When but a small amount of shortening is used, a small quantity of baking powder is helpful; this, of course, is omitted in puff pastry, in which the weights of the

flour and butter are equal, and it is not essential in other cases.

Few doughs require a smaller number of ingredients than pastry; flour, salt, shortening, and liquid are the essentials, and air is incorporated in the process of mixing. When the flour and shortening are warm they stick together so that less air is mixed into the dough.

Pastry

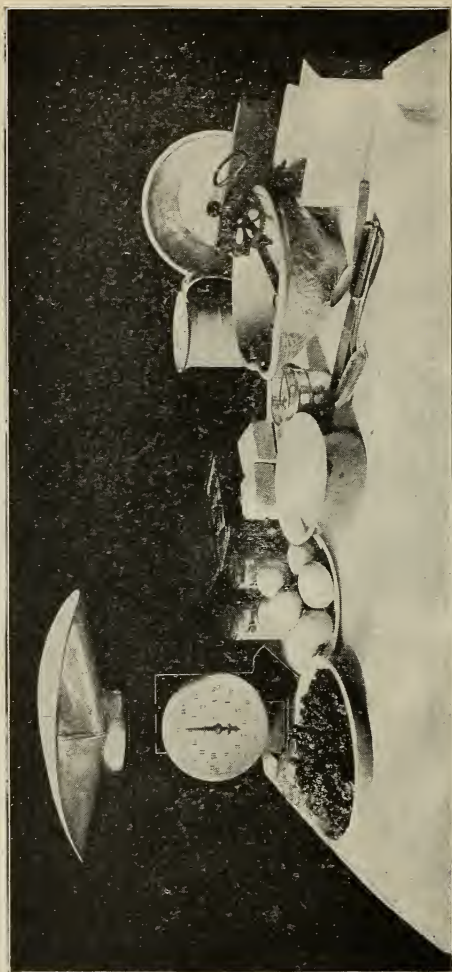


APPLE PIE IN DEEP PLATE.

The process of rolling and folding is a device for catching more air in the dough. This air, when heated, expands and puffs the layers apart. The colder the air mixed in the dough the greater its expansion in baking.

In cake-making a single, well proportioned formula may be made the basis for a great number of varieties. Therefore, it is essential that the fundamental principles be understood, then the variations can be accomplished easily.

**Cake
Making**



MATERIAL AND UTENSILS FOR MAKING CAKE.

The principles underlying sponge cake were explained in the section on eggs. The main points in such cakes, which contain no butter and are made light by eggs only, are to mix carefully that sufficient air may be entangled in the dough to make it light, and then to bake slowly but thoroughly.

Sponge
Cake

The shape in which cake is to be baked should decide the proportion of flour to be used. Layer cakes or small cakes require less flour than large loaves. This is probably because the small cake is stiffened more quickly by the heat, while the large mass must be stiffened with flour to hold up the air cells until the heat can penetrate the whole. Variations in cake are easily obtained through changes in flavoring ingredients. To mix chocolate in the cake melt it and mix with the sugar and butter. Such a cake might have a white frosting flavored with vanilla.

A cake flavored with almond may have a few shredded almonds sprinkled over the top just before the cake is put in the oven. Almond paste can be rubbed into the butter and sugar in making cookies; it is rather rich and heavy for a cake. Desiccated cocoanut, chopped nuts, raisins, currants, dates, citron, candied orange and lemon peel, singly or in various combinations, serve to give us many cakes from a single recipe.

Flavoring

The ingredients mentioned for pastry are common to all cakes as well, but further variety is gained by the addition of sweetening and seasoning. Air or gas to make the cake light is obtained by the use of

Ingredients

beaten eggs and of baking powders, etc., as well as by creaming butter and beating the blended ingredients. The shortening for this class of dishes may be lard, dripping, nut oil, cottolene, butter, or cream, each having its own special characteristic. When these are known, combinations and substitutions are possible to adapt a given formula to the available materials.

Sweetening

The range of sweetening is limited to sugar and molasses, but the quantity to be used in a cake should be



SPONGE CAKE STUFFED WITH CREAM.

reduced if a frosting or sweet filling is to be added later.

When we consider the long list of spices and extracts and fruits and nuts available for seasoning the cake, we can see how it is possible to make many varieties of the same cake.

**Relative
Proportions
in Cake**

There is a certain relative proportion to be followed in the use of these ingredients which, once learned,

enable us to decide whether a recipe is reliable. In butter cakes there is usually less butter than sugar, and less sugar than flour. When baking powder is used less is required than would be necessary for a dough where there are no eggs. Thus two even teaspoonfuls of baking powder is enough for three cups of flour for a cake in which three or four eggs are used. Some cooks use from one to two teaspoons of baking powder for each cup of flour in all cases, forgetting that the eggs alone would make a cake quite light. When there is an excess of baking powder, the cake is liable to be coarse grained and will dry quickly.

Dutch apple cake and cottage pudding are similar to the common muffin mixture in the proportions of flour, liquid, etc., but are made richer by increasing the quantity of fat and sugar.

Cottage
Pudding

The ordinary doughnut mixture is not unlike a cottage pudding dough, with the addition of flour to make it stiff enough to roll easily. Or it is similar to the quick biscuit dough with the addition of sugar, egg, and spice. Because doughnuts are cooked in fat, less shortening is required than for most stiff doughs.

Doughnuts

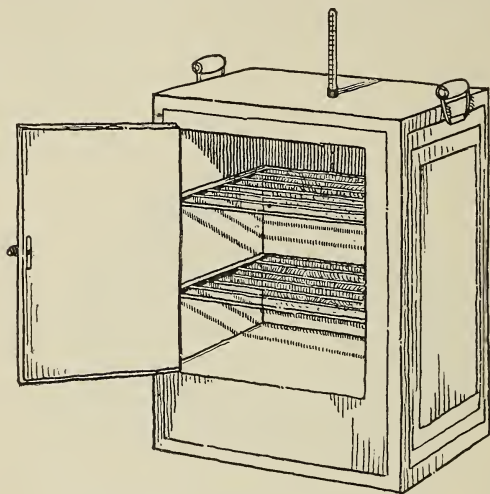
Cooky doughs are more like pastry with the addition of sugar, spice, and egg, and the same care should be given to keeping the dough cold in order to roll and cut it without adhering to the board.

Cookies

COOKING OF DOUGHS

Doughs are steamed, baked in the oven, or on a griddle on top of the stove. Such mixtures of many differ-

ent ingredients are more difficult to cook than the separate substances of which they are composed, though heat affects each ingredient in combination much as it does singly. Sugar carmelizes and this aids in producing a golden brown color in the crust of anything



AN ACCURATE OVEN THERMOMETER.

Punch a hole in a common gas stove oven and insert thermometer, which will register to 600 degrees F, wrapped with asbestos and wire where it passes through the top.

containing it. Since it burns readily, cakes and cookies are more liable to be scorched than unsweetened doughs. Flour browns when exposed to dry heat.

Eggs cook at a low temperature. Butter melts, hence doughs containing much must contain more flour than those that have little or none.

The heat applied should conform to the way in which it affects the principal ingredients in any dough. Those containing many eggs need moderate heat, etc., etc. The size and shape of the article are also to be considered. In general, small thin portions require less time but will bear higher temperature than larger portions as with bread doughs.

Heat
Required

There are various tests for the heat of the oven. Oven thermometers are valuable aids, showing comparative if not actual degree of heat. When a thermometer is inaccessible, a piece of white paper or a teaspoonful of flour if charred from a five minutes' stay in the oven indicate too great heat and other degrees may be gauged accordingly. All parts of an oven are not equally hot and each housekeeper must study her own.

Temperature
of the Oven

The lower part of a gas oven is very hot because the full force of heat is below; in the wood or coal range one side is usually hotter than the other because of the position of the firebox.

FORM AND FLAVORS

Thus far we have studied the fundamental principles of cooking and have seen that some knowledge of the chemical composition of each food is necessary before we can secure the best result through the application of heat and moisture. But this is only the foundation of the art of cookery.

Variety

The form in which our food is served may attract or repel, and the flavor may make it appetizing or the reverse. We must depend mainly for sustenance upon a few kinds of meat, vegetables, grains, and fruits, and unless variety were secured in some way we should quickly tire of them.

Through the ingenuity of cooks of all times and countries, so many combinations have been devised, by changes in flavor and form, that some of our common foods might appear in different guise every day in the year.

The multiplicity of formulas in our cook-books, even when well classified, are puzzling to the beginner who has not learned to analyze each recipe and thus find the simple processes of which it consists.

"Fancy" Cookery

What is generally termed "fancy" or "high-class" cookery is merely the application of the simple processes to costly foods or a further complicated preparation to foods which have first been cooked as perfectly as possible, according to the principles already outlined.

For example, if we have learned how to make a white sauce and how to cook meats and vegetables, we do not require separate detailed recipes for creamed chicken, creamed oysters, creamed potatoes, creamed cauliflower, or creamed asparagus; we only need to make the sauce a little thinner or thicker to offset the

Creamed
Dishes



CREAMED FISH IN RAMEKINS.

dry or watery nature of the article with which it is to be put and to vary the flavor slightly to adapt it to another material.

Furthermore, any such creamed meat or vegetable may be served plain, or on toast, or in timbale cases, or combined with buttered crumbs, as a "scallop," or by the addition of stiff egg whites it becomes a "soufflé" when baked. When the sauce is made of double thickness, and combined with the meat or vegetable and chilled, the mass may be shaped into croquettes or cut-

Variety
in Serving

lets which are then coated with egg and crumbs and fried.

Thus any intelligent woman knowing something of the nature of foods and the effect of heat and moisture may to some extent make her own recipes or adapt others to the supplies available at the moment.

Adaptation

No cook-book can be sufficiently expanded to provide for great variation in climate, food materials, and utensils. The cook must constantly adapt to her conditions, she must be observant of the changes of temperature and learn when one food material or flavor may be substituted for another.

**Principle
of Contrast**

If uncertain about the wisest combination of articles of food, whether in a single dish or for the different courses in a menu, it is safe to follow the plan of contrast. Thus the cream soup is served with crisp crackers or croutons, the creamed fish is covered with buttered crumbs and baked till crisp, the croquettes are crisp outside and creamy within.

Another point is to add to any food, substances supplying any of the food principles it lacks. Potatoes are mashed with cream or butter because they lack fat, are blended with egg for croquettes or soufflé because they lack protein. Eggs lack starch, so we serve them on toast or use them in puddings with rice, tapioca, etc.

**Made
Dishes**

Composite preparations of food, often classed as entrees or made dishes, are known by many names derived from different languages, especially from the French.

Here is no place to attempt to define all the terms used on a menu card, but we may group some of these compound dishes under a few general heads and study their characteristics.

Names

Soups have as their basis either animal or vegetable stock or both combined. Stock is secured by the aid of heat and moisture from portions of meat and vegetables too tough to be used in other ways. Flavor and some nutriment are soaked, cooked and strained out, and this water is the stock which is then further flavored and garnished by the addition of some contrasting substance. Thus a meat stock is usually garnished with grains or shreds of vegetable, and a vegetable stock is often combined with milk and thickened.

Soups

Stews are thick soups containing larger portions of the meat and vegetables. These are also known as chowders, ragouts, salmis, etc., etc. Sometimes a stew has dumplings steamed over it, sometimes it is covered with a crust of pastry, mashed potatoes, or cooked cereal and baked as a pie. Here again are combined contrasting food principles.

Stews

Hash is a term that also may include the assortment of foods known as scallops, timbales, etc., since the substance giving a specific name to each of these is minced or chopped fine before it is combined with other materials. Meat and fish are put on toast or mixed with potatoes or bread crumbs or encased in rice or in a pastry shell. The exact proportions of the con-

Hash

trasting ingredients is of less importance than their proper moistening and flavoring.

The *scallop* owes its name to the shell in which it is often served. *Au gratin* is another name for the same combination of a meat or vegetable with sauce and crumbs. The *croquette* gets its name from its crisp crust, the *timbale* from its thimble-like shape. *Rissoles* and *kromeskies* are kinds of fried meat pies or croquettes in a pastry crust.

Souffles

Soufflés have as a foundation fruit or vegetable pulp or minced meat in a sauce and are puffed up by the introduction of stiffly beaten egg whites. The name is sometimes given to cold dishes where a similar effect is gained by whipped cream.

Salads

Salads may consist of cold cooked meats, fish, etc., vegetables cooked or raw, fruits and nuts. Almost any food may be served in a salad, singly or in combination. The distinctive feature of a salad is the dressing of fat, oil, butter, or thick cream, which is variously flavored.

Left Overs

Many of the most satisfactory of these made dishes doubtless had their origin in an effort to use left-overs.

Milk surplus may be used in many ways. Skimmed milk answers as well as full milk for soups and doughs when fat is also used. Even if otherwise likely to curdle in heating, the addition of a little cooking soda makes it possible to scald milk, and then it may be used for custards, puddings, etc. Sour milk is available for

doughs and cheese, and cream may be substituted for butter and milk in simpler cakes and cookies.

Eggs left at the table in a soft-boiled condition may be cooked again until hard and then combined with sauces and served on toast or used as a garnish in soups or salads.

Meat left-overs should be carefully sorted.

The obloquy heaped upon hashes is due to carelessness. All uneatable portions,—bone, skin, and gristle, should be removed, but may yield a little stock if put in cold water. The clear lean may have about one-fourth as much fat with it if it is to be used in the combination with potatoes, bread or cereal. There may be two grades of the lean, one cut in pieces of uniform shape an inch or more across, to be served in a sauce or moulded in a jelly; the other to be chopped fine for hashes, croquettes, etc.

Meat
Left Overs

Vegetables. Cooked vegetables spoil quickly but often may serve as soup, or a scallop, or a salad for a second meal.

Fruits. It seems practically impossible to put together several kinds of fruit without good results. Combinations of left-over fruits, raw or cooked, will serve as the basis of a gelatine dessert made like the jelly described elsewhere, or may be frozen alone, or combined with cream, or thickened for a pudding sauce, or diluted with water for a fruit punch. Add sugar as desired.

Fruit
Combinations

Bread. No scrap of bread of any kind need be lost. Brown bread and muffins of different kinds are sometimes wasted when they might be steamed, or toasted and served in cream sauce, or made into puddings like a baked Indian pudding. Slices of stale raised bread, dried, gives us croutons, cut in cubes, or crumbs white and brown, coarse and fine, to use for scalloped dishes, stuffing for fish and poultry, and for many kinds of sweet puddings.

Attractive
Form

The use of gelatine is an instance of our endeavor to make foods attractive in form. It has doubtful food value and no agreeable flavor, but it gives solidity to fruit juices, or in aspic jelly to soup stock, and in such jellies we may mould fruits for dessert, or meat and vegetables for salad.

Garnish

Garnish is often desirable to make foods more appetizing, but it is a question whether this purpose is served by the addition of unedible materials which must be laid one side before the food itself is accessible.

The truest art does not waste effort on useless things.

Shapes

The form of foods is further varied by utensils producing different shapes, the meat choppers with adjustable knives for particles of different sizes, the fancy knives for making thin slices or balls of vegetables and fruits, the muffin pans, waffle iron, the timbale iron, the many cutters and moulds for puddings, etc. The tendency of the present day is plainly towards small portions for individual service, and here again a

new recipe is not required, only the necessary changes in time of cooking which would result when a mass was divided into several portions. Moulds in which a food is to be cooked should be greased, but rinsed with cold water when the food is only to be cooled in them.

Scales and measures are lacking in many kitchens and accurate work is impossible without them. The

Weighing



SALMON LOAF.

average kitchen need not be furnished with many special utensils, but there should be a full supply of "general purpose" articles of the best grade of material and finish.

The utensils should be adapted to the size of the family and to the physical ability of those who are to use them. The saving of human life and energy is more to be considered than the durability of implements.

Utensils

FLAVOR

The art of cooking shows us many ways of developing the appetizing flavor of foods.

Preparation

First, by the removal of whatever might produce bad flavors, such portions as skin and tainted bits of meat, decayed parts of vegetables, and over brown portions of bread and cake.

Right
Heat

Second, by the right application of heat and moisture to bring out the natural flavors in each food. The steeping of tea instead of boiling, the browning of the coffee berry and cocoa bean before they are ground, the flavor developed by long cooking in cases like the baking of beans and steaming of puddings and brown bread. Sometimes a portion of the nutritive value is sacrificed to flavor, as in the browning of the outer surface of the steak or roast.

Third, by the use of many additional flavoring materials to intensify natural flavors to supply deficiencies and to produce variety.

Common
Salt

Salt is useful as a preservative, seems to supply a need in the human system and therefore is an agreeable addition, but it also serves to bring out natural flavors. As an illustration of this power, taste of a meat or chicken broth that is unsalted, and again after salting, when the flavor of the meat will be much more apparent. For this purpose salt is often eaten with fruits, is added in minute quantities to lemon and other jellies made with gelatine, to custards, ice creams, and often even to coffee.

Lemon juice is also an aid in extending other flavor and is acceptable with many foods, especially fish.

Salt, pepper, lemon, and onion are the extent of the flavors used in some households, and food need not be insipid if no others are tried, but it is wiser to make occasional use of the long list of condiments and spices.

Common
Flavoring
Material

The distinction as usually made is that the condiments pepper, mustard, etc., are used with meats, while spices, cloves, ginger, cinnamon, nutmeg, etc., are associated with fruits and sweets, but this classification has exceptions. Spices are neglected nowadays and it often seems as if people hardly were acquainted with any other flavor for dessert dishes than vanilla. The list of flavoring herbs is a long one, running through sage, thyme, majoram, summer savory, bay leaves, tarragon and parsley, which are used dry or fresh, to the green mint, cress, and salad plants which are condimental rather than nutritive.

Condiments
and Spices

There are many compound flavors which every housekeeper should keep in her store closet, and use in her cooking instead of supplying a single perennial catsup on the table, such are curry, tabasco, tarragon vinegar, mushroom catsup, poultry seasoning, etc.

Onion, celery, cheese, chocolate, coffee, meat extracts, each may have an important place in our list of flavors.

Sugar is an important food and also must be looked upon as a flavor, since it will often bring an insipid vegetable up to its normal condition.

Sugar
as Flavoring

**Blended
Flavors**

French cooking excels in that blending of flavors which produces an agreeable effect, though no one is apparent.

**Adding
Flavoring**

The best results are usually reached when the flavoring is combined with the food in the process of cooking, but there are right and wrong ways of doing this. If salt is put on the cut surface of a roast, juice will be drawn out, but if sprinkled over the fat will gradually flavor all. Whole herbs and spices, tied in a bit of cheese cloth may be left to cook in a soup stock or brown gravy until the desired flavor is attained and then withdrawn, leaving the stock clear. Ground spices would give a cloudy effect.

**Reasons
for the Use
of Flavoring**

The use of flavors is economic, for thus inexpensive foods are varied and made palatable. It is a part of the art of cooking, since nowhere are greater skill and intelligence required than in the distribution of these elusive yet powerful substances, and by discrimination in the use of condiments and spices our foods may be made more healthful.

FOOD FOR THE DAY

In the preceding pages the most important foods, their composition and preparation for the table have been considered. Our study would be incomplete without some reference to their best combination for the daily meals that they may appeal to the palate and promote health without exceeding the bounds of moderate incomes.

There are three important divisions in the preparation of food for a family, wise buying, good cooking, and careful serving. When buying foods the housekeeper should know the sum available for feeding each person for the day or week, she must note the season of each food, and also adapt her choice to the climate and weather. She must remember the individual needs of each member of the household, depending upon age, health, and occupation.

Buying
Cooking
Serving

The art of cookery finds its field between the choice of food and the serving of the cooked dishes at the table. As with other arts perfection can come only through constant practice in manipulation, and from continual adaptation of conditions to the desired end. No formulas for combinations of foods can be devised so complete that continuous care is not required in every step of the process.

Art of
Cookery

**Cost of
Food**

Few housekeepers have the time or take the trouble to keep their accounts in such a way as to know how much it costs to feed each person in their charge for a day, week, or month; fewer still know anything of the relative proportion of protein, fat, and carbohydrate which is placed on the family table week by week.

When purchasing clothing we take note of its wearing qualities and the ability to keep us warm, but we seldom apply the same reasoning to our foods, although it is quite as necessary.

Some one has estimated that in the average household one-tenth of the sum spent for food will go for flour, a tenth for butter, another for sugar, another for milk, one-fifth for meat, one-fifth for fruit and vegetables, and the remaining fifth for sundries.

"Constants"

There are certain articles of which equal quantities will be used each week or month, and by an examination of previous bills it is easy to estimate the amount required for a given period. Many of these "constants" like butter, sugar, and flour, can be bought in quantities sufficient for a month, then the housekeeper knows how to apportion her money for the variable supplies.

It is not necessary for the housekeeper to attempt to estimate the proportion of food principles in every dish she serves, but once a month or a quarter, if her accounts are well kept, she can see how nearly she ap-

proaches such daily estimate as the one below for each member of her family :

A DAY'S RATION

	Ounces.
Meat and fish	12 to 16
One egg	2
Butter	1 to 2
Milk, 1 gill to 1 pt.....	4 to 16
Sugar	2 to 3
Dry fruits	1
Legumes	1
Fresh vegetables and fruits	6 to 8
Potatoes	8 to 12
Flour and grains	12 to 16

Multiply this by thirty and we have a fair allowance for one person for one month. Multiply this by the number of persons in the family, or, to be more accurate, by the fractional parts of a man's rations, usually allowed for women and children, and we have an ample supply for one month for the family.

If the larger quantity of potatoes has been used the smaller amount of flour would have been ample, while if eggs were cheap and two or more consumed by each person daily there should be a corresponding reduction in the amount of meat and fish.

Of the amount purchased there will be not far from 10 per cent refuse and waste. Refuse in the form of bones, skin, and parings, waste of what is left on individual plates and odd bits that are spoiled and are

Refuse
and Waste

thrown away. Much fat also is thrown away, but it should be remembered that fat is worth more than twice as much as the carbohydrates in keeping the body warm.

**A Day's
Allowance**

Twenty-five cents a head a day is a fair allowance for an abundance and variety of wholesome, satisfying food. Life may be sustained on half that amount, while fifty cents daily cannot nourish more completely, but may provide luxuries and foods out of season.

**Cost of
Labor**

The actual cost of table board appears, from studies made under different conditions, to be about equally divided between the raw material and the labor required for the preparation and service. It may be cheaper to pay a little more for a prepared food than to use one's own strength or pay for service to get ready a less expensive article.

The woman who has time and strength and no other way to earn should choose the cheaper grade of food. Cheapness does not always indicate meanness, it may mean an abundant supply or less human labor in preparation.

**Prepared
Food**

There is a growing tendency toward the fuller preparation of food outside the home, but there is the more need that the housekeeper should be familiar with processes of manufacture that she may know when she is well served.

Buying

The housekeeper who never goes to grocery and market and does not study the market reports in the

papers is rarely an economical buyer. She is liable to go on in the same old routine instead of varying her menus with the little surprises that may be found by visiting the markets. There are bargains to be had in foods as well as in clothing, when the market is overstocked, or some odd lot is left over. Cuts of meat cannot be made to order and the first choice falls to the early visitor to the market.

Where one woman must take entire care of a family, she must plan carefully if she would have a well balanced household. Elaborate cooking and meals of many courses are out of the question even if they were desirable. Meals should be planned several days in advance and the buying done accordingly, though such plans will be much modified in the performance.

Planning

A reserve store of canned foods, etc., is a great aid in the emergencies that arise in all households.

By wise use of outside supplies and by making one's head do more work and hands and feet less, the food for a family may be provided without exhausting the energy of the housekeeper.

System

The actual cooking necessary for a family through a day may be done in a shorter period than is usually allotted to it if the work is planned wisely. The detail of arrangement depends upon the kind of fuel used, and whether the chief meal is served at noon or night.

Breakfast

The breakfast should be a simple meal—fruit, raw or cooked, cereal or warm muffins, (seldom both at the same meal), and eggs, bacon, creamed salt fish or some cold meat. When the meat is cold the bread is warm, while with bacon or omelet toast may be served.

Some one must be in the kitchen for some time to prepare and serve even a simple breakfast, especially if there are tardy members of the family. With the same supply of fuel required for the muffins, it is not difficult for a woman of average ability to bake a cake or pudding which will then be ready for the noon or the night meal. Or at this time the vegetables may be cleaned, fruit picked over and little details attended to which save much time later.

Dinner

Noon dinners usually are considered easier for housekeeper and cook, since the work can all be done by daylight and the hours of work if not actually less are not so extended through the day. When supplies are ordered early and delivered promptly, much energy and worry is saved. At least half the time the soup may be derived from previous supplies, and be prepared in advance.

One kind of meat or fish, potatoes or rice and a single other vegetable or salad are enough for all ordinary occasions. Fruit or a dessert prepared earlier in the day completes a meal sufficient for all needs of the human body if the articles have been chosen wisely to supplement each other.

For a noon luncheon or night supper there are many variations of the soufflés, hashes and scallops already described. One of these with bread and butter, tea or cocoa, fruit and a simple sweet will provide all that is essential.

Supper

To prepare meals for a family year in and out is not an easy task. The housekeeper must remember not only the cost and nutritive value of the foods but the whims and notions of her family. The ability of the human being to talk makes him much harder to feed than the animals who must accept the balanced ration bestowed upon them.

A few points to be observed in planning menus are these: avoid routine, introduce novelties, cheap or expensive, in attractive form, but say little of nutritive value or cost. Do not allow the same meat or fish to appear too many meals in succession. Let something else intervene. When the meat course is substantial let the dessert be light and make the dessert especially nutritious when the meat course is insufficient. Let there be variety on the table through the week or month but have few dishes at each meal.

Planning
Menus

The fundamental processes of cookery are not many and the essential points have been outlined in these pages. An intelligent woman can adapt the recipes in any reliable cook-book to her own conditions after she knows something of the composition of foods and the way each is affected by heat and moisture.

In
Conclusion

PRINCIPLES OF COOKERY.

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Practical Sanitary and Economic Cooking (\$0.40). Mary Hinman Abel.
Young Housekeeper (\$1.00). Maria Parloa.
Rorer's (Mrs.) New Cook Book (\$2.00). Mrs. S. T. Rorer.
Easiest Way in Housekeeping and Cooking (\$1.00). Helen Campbell.
Hostess of To-day (\$1.50). Linda Hull Larned.
Luncheons (\$1.40). Mary Roland.

Note.—For the convenience of students the School will purchase and forward any of the above books on receipt of the price given.

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- Free, of the Department of Agriculture, Washington, D. C.
34. Meats: Composition and Cooking. Charles D. Woods.
74. Milk as Food. Office of Experiment Stations.
85. Fish as Food. C. F. Langworthy, Ph.D.
93. Sugar as Food. Mary Hinman Abel.
112. Bread and Bread Making. Helen W. Atwater.
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128. Eggs and their uses as Foods. C. F. Langworthy, Ph.D.
182. Poultry as Food.

PRINCIPLES OF COOKERY

PART III.

Read Carefully. Place your name and address on the first sheet of the test. Use a light grade of paper and write on one side of the sheet only. *Do not copy answers from the lesson paper.* Use your own words, so that the instructor may know that you understand the subject. Read the lesson paper a number of times before attempting to answer the questions.

1. Mention and describe three methods of making doughs light.
2. What are the advantages in the use of baking powder? When should baking soda and cream of tartar be used separately?
3. Describe some mixture where more than one means of making it light is used.
4. How does the bread obtainable outside your home compare with what you can produce there as to cost, including time and fuel, substance, and palatability?
5. Experiment, if you can, under your own conditions and report of the effect of too rapid and too slow baking on different types of dough.
6. Rearrange this recipe for a simple cake in proper proportions and order of mixing: $\frac{1}{2}$ egg, 2 teaspoonfuls butter, 2 c. milk, 1 c. flavoring, 1 teasp. flour, 3 c. baking powder, 1 teasp. sugar.

PRINCIPLES OF COOKERY.

7. Give examples wherein the form and manner of serving may add to the attractiveness of food and not require too much time.
8. How does bread flour differ from pastry flour? How does this affect its use in doughs?
9. Give the general proportion of flour and liquid in (1) soft doughs, (2) a batter, (3) muffin mixtures, (4) pastry or cookies.
10. Why does shortening make doughs flaky?
11. Give the one method of making bread. What conditions will hasten the process; what will retard the process?
12. Successful pastry—how made?
13. What varieties of cake are there and what are the general proportion of the ingredients? Give some of the reasons why a cake “falls?” What makes cake dry and coarse in texture?
14. Discuss the use and abuse of “fancy cookery.”
15. What is meant by contrast in foods? Give examples.
16. What can you say of flavoring?
17. How may “left-overs” of meat—of vegetables—of bread, be used?
18. On what principle should menus be planned?
19. Give the menus for the meals served in your household during one week and suggest how they might be improved without additional labor or expense.

PRINCIPLES OF COOKERY.

20. With what cook book are most familiar? What are its good points and what are its deficiencies?
21. (a) Give some receipt or method which is a success—original if possible. (b) Tell of your failures in cookery.
22. Are there any questions that you would like to ask relating to the “Principles of Cookery”?

NOTE.—After completing the test, sign your full name.

Household Management

PART I

LESSON PAPER

PREPARED BY

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1905

American School of Household Economics

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AMERICAN SCHOOL OF HOUSEHOLD ECONOMICS

Home Economics

STANDS FOR

The ideal home life for today unhampered by the traditions of the past.

The utilization of the resources of modern science to improve the home life.

The freedom of the home from the dominance of things and their due subordination to ideals.

The simplicity in material surroundings which will most free the spirit for the more important and permanent interests of the home and of society.

HOUSEHOLD MANAGEMENT

IN THE study of Economics there are two great divisions—production and consumption. Until within a few years, by far the lion's share of time and study has been given to the first of these divisions. It has been deemed sufficient for the securing of happiness and prosperity to a people to point out how the greatest degree of efficiency in *producing* wealth might be obtained. The manner in which that wealth was expended was considered less important. Recently a decided change has taken place. A conviction has been growing, especially among students of economics, of the equal importance of the other division, which covers *the use made of the money* after it has been acquired. This emphasizes the important place of the *home* in Economics as will be realized by those who consider how largely the home is the center of the consumption of wealth.

Divisions
in Economics

In former times the home was practically the entire economic world. Most of what was produced to meet the needs of the people originated there, while all of it found ready consumption within the family circle or by limited exchange. To-day the shop and factory have taken most of the productions and developed them

Place of
Home in
Consumption
of Wealth

one by one, into large industries outside the home, such as the manufacture of dress goods and cloth of all kinds, carpets, bedding, candles and soap; trades, such as tailoring, shoe-making and millinery, all having their origin in the home. The preparation of food is almost the only work left to the home which may be called creative, unless we include the supreme work of developing men and women.

Yet with production passed practically out of the control of the home, we find the other branch of Economics, consumption, still chiefly confined there. Most of the wealth acquired outside is expended on either the home or the interests closely connected with it. Women thus become the main directors of these expenditures. It is generally conceded that most of them stand in great need of a better understanding of the importance of the work that is theirs, and of the principles which underlie all correct economy.

Economy

Two aims are of equal importance in the practice of economy; (1) to increase the income, and (2) to diminish the expenditures. The last contains possibilities of comfort of quite as high order as the first. There are, according to Devine, "three methods by which general prosperity may be increased; a better choice, a better production, a better consumption. In comparing the relative importance of the three methods it will be found that there are greater immediate possibilities in the third (a better consumption) than in either of the others, and that of the two that

remain, the first (a better choice) is more important than the second."*

In the light of all these facts it is a surprising thing that anyone can look lightly upon the share that is given to woman in the economic struggle. There are those who urge that the reason why women are finding the care of their homes less attractive than formerly is the fact that all which adds zest and is worth while is taken from them. Rather is it true that some things which demanded time and strength have yielded to more vital things, and there is now opportunity to perfect that which is left, with a better appreciation of its importance.

**Economic
Position
of Woman**

Devine further affirms that "it is the present duty of the economist to magnify the office of the wealth expender, to accompany her to the very threshold of the home, that he may point out, with untiring vigilance, its woeful defects, its emptiness, caused not so much by lack of income, as by lack of knowledge of how to spend wisely. There is no higher economic function than that of determining how wealth shall be used. Even if man remains the chief producer, and woman remains the chief factor in determining how wealth shall be used, the economic position of woman will not be considered by those who judge with discrimination, inferior to that of man. Both may in their respective positions contribute directly and powerfully to the advancement of general prosperity."

**Office
of the
Wealth
Expender**

* Devine: *Economic Function of Woman*.

**Use of
Money**

As women awaken to a realization of this truth, and bend their energy to acquire the knowledge and skill necessary to do their part more successfully, we shall begin to attain the degree of comfort and prosperity possible for us to enjoy. There is far more money earned in the majority of families than is wisely spent. The error is frequently careless expenditure, not sloth in acquiring, a *misuse* rather than *lack* of income. The old adage, "A penny saved is a penny earned," should be daily before the housewife. She should weigh in a less vague and general way the saying that "one cannot have his money and spend it too." Money has but a limited purchasing power: if it goes to gratify one desire, another must be denied. Few, very few, are able to satisfy all material desires. The mistake is made in giving too little thought to the various avenues of expenditure, the desire uppermost at the time being the one gratified, regardless of the relative importance of others. Combined with this are usually the failure to exercise foresight and the lack of sufficient knowledge of values to insure full money value for each outlay. "The woman who longs to get where she 'won't have to count every penny' will never have her longing satisfied until she makes every penny count."*

**Business
Side of
Home-Making**

As the economic importance of the home is more fully realized, the business side of home-making is emphasized. The home has a close and intimate rela-

* Miss Richardson: *The Woman Who Spends*.

tion to the business world in general. The housewife in her customary purchases comes in touch with retail trade of almost every variety and adds her contribution. If she makes use of the bank as the best medium of exchange, she shares in the interests of one of the large business enterprises. With a surplus to invest, she has to do with one or another branch of the business world in selecting the form of investment, and in looking after the income from it. To conduct any and all of these interests in the most efficient and successful manner requires as thorough training as for any other line of business. Only business-like methods can succeed. The reason why so many women fail at just this point is from a lack, in their early life and education, of the training which develops business ability.

HOUSEKEEPING A PROFESSION

Housekeeping ranks among the professions as truly as any other occupation. It is more than a trade, since one who works at a trade performs each day the task assigned, the work being planned and directed by another. Thus little of the worker's energy is expended in deciding his activities. It is the *director* who must possess and exercise the power to guide; his work being to initiate, plan and direct. This requires larger capacity and ability than is required of the one who merely practices a trade.

Initiative

It is the work of the housewife to initiate, plan and direct the business of the house. The woman who considers this work as the opportunity to assist

in sharing the responsibilities of the wage-earner, and in developing the powers of those making up the family, has grasped the truth concerning the possibilities of her work.

Need of
Education

There should be no more question as to the need of education and training for the woman who *selects* the food, clothing and works of art which minister to the highest welfare of a family than there is for the need of study on the part of the farmer, the manufacturer, or the artist who produces them.

Estimation
of Values

Everywhere training is showing its benefits in the greater efficiency and skill of those who take advantage of it. Women will never be able to spend money so as to bring adequate results, until they have in some way acquired a broad training in the estimation of values. The word of the salesman is a poor guide, yet one who has had no training to aid her is unable to select for herself any more satisfactorily. Houses which are turned over to "experts" are usually striking witnesses of abundant expenditure, but pitifully fail to convey to eye or heart the refreshing individuality or the satisfaction to be realized in the cultivated woman's home.

Education
of the
Home-Maker

The fullest, most completely rounded education is none too good for one who is called upon to use and impart so varied information as is the housewife. The study of science is especially practical for one who aspires to master all the things that come within the range of her work. A knowledge of chemistry is

necessary to an understanding of food composition, of cooking, cleaning, etc. The laws of physics are as closely related. For the mother, modern psychology is an indispensable study, if she is to understand her child, and wisely guide its development. If this knowledge may not be secured in school, a great deal may be done to supplement such training. Study in this course should do much along this line.

In addition to the knowledge gained through study, there should be a liberal amount of *practice* in the various duties before one assumes the care of a house. Unfortunate the home where the practical experience all comes after marriage. It comes at the hardest of periods and is unjust to any man. In no business can failure be graver or the results more serious. The fact that some very efficient housekeepers have evolved from unpromising beginnings is no argument. Such are, without exception, most eager for their daughters to receive training, since they know by dear experience its value.

Much of the present aversion to household duties would vanish before adequate preparation to perform them. The American Kitchen Magazine published, in January, 1901, some suggestions of leading men on the general subject of *Housekeeping on a Businesslike Basis*. Some of their remarks are significant. One says: "Whenever one's knowledge of a subject has passed the stage of drudgery and becomes a science, its performance immediately becomes a pleasure. The ability to do a thing in the highest known perfection,

Practice
Necessary

Housekeeping
on a
Businesslike
Basis

**A Right
Spirit**

or a little better than anyone else, is always a source of delight, and it matters little what that something is. This spirit imparts its influence to everyone in any way associated with the work. The men or women who know their business seldom have difficulty in keeping those under them happily employed. Wherever the circumstances of our life land us, we should make our stand, do our part of the world's work, and do it well. The woman who would have a home of her own and a happy one, should know, not only how to manage the chambermaid, but the cook as well. The moment that either discovers that there is method on the part of their mistress and knowledge superior to their own, they will comply with her requests. There will be no trouble with the kitchen end of the house when women take the same pains to know their business as men do.

**Training
and
Devotion
Essential**

"The first essential is the proper training. The second essential is such a desire for success that she is willing to perform her part with industry and devotion.

**Business
Principles**

"It is not as necessary to show that housekeeping has in it elements of business as to make housekeepers themselves recognize its business character and apply to it ordinary business principles. A quick attention to details, a fine sense of values, good judgment in buying and selling, and a ready adaptation of means to end with the least possible loss, are points of a good business man,—the housekeeper certainly has need of them."

HOME EXPENDITURES

Whatever the condition of a family, whether large or small, in city or country, in private house or apartment, the successful expenditure of money to supply the family with needed comforts depends vastly more upon brains than upon dollars, upon the standard of life than upon circumstances. To know where to economize and where to lavish, to be on the alert for the small wastes, so often disregarded,—only training and experience can realize the ideal in these things.

The extreme economies practiced in former years are beyond doubt questionable in these days of astonishing increase in the production of wealth. Time has become too valuable to be profitably spent in weaving rag carpets merely to save the rags. If done, there must be some aesthetic value found to justify it. The same holds true of many occupations of the earlier housekeeper. The taking of these occupations from the home and the development of them into independent industries has liberated much time and strength, which it is the duty of the housewife not to waste. The changes have been phenomenally rapid, and adjustment could hardly be expected to keep pace, but there is much to indicate an appreciation of the situation on the part of many women and a sincere desire and endeavor to co-operate in meeting the changes intelligently.

There is no less need of the practice of economy in the expenditures of the present time than formerly,

Extreme
Economies

True Economy

even if the methods necessarily differ. For instance, while we may afford ourselves finer materials and more variety in clothing there is a correspondingly greater demand for wise and intelligent choice of materials for bodily needs and the avoidance of such as purport to be what they are not. Otherwise extravagance in the loss of time through illness, or even of life itself, results. Economy in food no longer requires the family to forego certain food-stuffs which were formerly luxuries. The requisite is rather the exercise of foresight in buying the product when in season, or legitimately within the reach of the limited purse.

Standards
of Life

One must have a standard, consciously defined and recognized, in order to choose successfully. A standard of life consists of those principles which guide one's motives and direct one's activities. Conscious standards are not often enough realized in things ethical. We have standards of weights and measures by which all weights and measures are tested. We have standards by which we discriminate in music, art, and many other things. But who can define his *Standard of Life* readily? We may reveal it to others, in fact we are constantly doing so as we decide this or that. The great difference between a successful person who accomplishes much, and one who never seems to amount to anything in particular, is the difference in which their standards of life have been made clear and conscious, thus becoming a vital, guiding factor in action.

We recognize innumerable varieties of standards, as the result of varying education and training, advantages and opportunity, or the lack of them. False standards arise from failure to discriminate between *needs* and *wants*. There are conflicting opinions as to what vital needs are, although it would seem self-evident that they consist materially, in *those things which man must have to live under the best conditions*, such as pure food, healthful clothing, sanitary houses, sufficient air and light together with those things which will minister to his highest intellectual and spiritual development. Through failure to distinguish intelligently the majority of people spend two-thirds or more of their income for what fails to bring them the best results in health and happiness.

Needs
and
Wants

We are too inclined to scorn the women of former days because of their more limited horizons. We may profitably study their understanding of their conditions and needs and the wise adaptation to them, which gave them an important place in the work and progress of their time. The women who succeed today in the use of larger opportunities are those who, like them, dare to live in intelligent independence, true each to her individual standard of life. Such women do not indiscriminately copy the manners of living or dress of others merely to be like them or in fashion. They are not ashamed to acknowledge a liking for home-making and housekeeping. They spend with care and judgment. A suggestive, com-

Adaptation
to Conditions

parison between the women of the past and those of the present is that of Miss Richardson in *The Woman Who Spends*: "In olden times women thought and thought and thought before they spent, often making the spending a burden. Now women often spend, and then think and think and think. Nor does the lack of thought beforehand ease the burden of the results of her spending."

Good
Intentions

As urged elsewhere it is not enough that we be well-intentioned since even then we may be painfully or harmfully extravagant through ignorance. We must know not only that pure food, hygienic clothing and durable furnishings are well, but we must know what constitutes each and how to secure them. Otherwise we must be classed among the extravagant.

No true economy can be practiced in the home until a standard is adopted by all the members of the family, in which there is agreement of effort to promote the family well-being; at the same time that all unite to accept with intelligent grace the common deprivations necessary to lessen family waste either of money, labor, time, health, strength, or possessions.

Differing
Standards

Standards in regard to living must necessarily differ greatly with different individuals and families. The education, tastes, and occupations of people differ so widely that it would be entirely impossible to establish a universal standard. That one may have greater demands than another is purely accidental, yet must be reckoned with. Even our individual stand-

ards are not stationary but are ever giving way to new and higher ones if we are as progressive as we should be. All this makes it difficult to proportion expenditures so that the highest good shall always be secured.

The most important reason for attempting to classify our wants and our provision for their gratification, is that thereby we may provide ourselves with a definitely recognized standard which can be reckoned with, studied, and, from time to time improved. Man shares with the brutes a low or primitive range of desires consisting of the satisfying of the physical demands for food, rest, shelter and clothing. Gradually he comes to desire other things, his standard is raised, and by the repression of his desires in the lower range he is able to secure satisfaction in the higher. The day laborer necessarily has standards as to food which differ from those of the scholar. The scholar must expend more for dress, perhaps, regardless of the difference of income but this difference is not vital, since all genuine and legitimate differences seem to promote progress in the people. The danger lies rather in "accidental accompaniments" which are not necessities.

Value of
Classification

In deciding upon a standard of life, one acts upon his best judgment at the time, independent of others, except as he recognizes that he may improve his standard by comparison with theirs. "Style of living," on the contrary, is thrust upon one from without. Ac-

Style of
Living

cepting it, he becomes its slave, entirely dependent upon what "they" will say as to this or that expenditure, never upon the consideration of the real good to be derived.

Accurate
Record
Important

Only by keeping an accurate record of expenditures can one follow the outgo so as to find how the standards of the family measure up to the ideal. Without indisputable facts in black and white one is easily deceived. It is natural to feel that economy is being practiced when many a coveted article is resisted. The year's bill with its record of many other indulgences is sometimes a rude but wholesome awakening. Twenty-five cents to-day and another to-morrow for some luxury in food seems too slight to take account of, but multiplied by three hundred and sixty-five the increase in the food-expense becomes a considerable sum. It is well to look frequently to aggregated expenses like these.

Basis of
Classification

In arriving at a basis for the classification of expenditures it is helpful to compare those of a large number of families, studying the avenues of expense to determine in what way the maximum of health; physical, mental, and moral is reached. Several such comparative studies have been made and a few typical budgets have been selected to illustrate the method pursued in attacking the problem.

In making a classification of one's own, it will be most useful to decide upon a tentative division of the year's income under the heads which seem most valu-

able to keep as separate divisions. These proportions may be studied in per cents, or the salary for each week or month or quarter may be divided and the amount for each division reserved to defray the expenses which arise in connection with that division during the period. As time goes on one is able to see how accurately the provisional division was made to fit the needs.

Such a theoretical division should always be decided upon as a check to undue expenditure, as one will try to bring the actual expense within the limits that seemed wise to set when all things were taken into account at the time of deciding upon the proportions.

Theoretical
Division

A regular income is the fortunate arrangement in many families. This tends to develop thrift and to remove the tendency to run up bills leading to debts. The tendency for such is to live up to the limit of the income and the division for saving and higher life in general is usually small. It is found that salaried people seldom get deeply in debt, but also seldom accumulate very much.

Tendency
with Regular
Income

For those without regular and known income the problem of apportioning expenditures is very difficult. The only safe course is to determine upon a definite minimum income. The surplus will then be an unexpected pleasure.

The actual per cent of the income allowed for each division will depend chiefly upon two things; namely,

Division
of Income

the size of the income, and the ideals or standards of the family. The necessities of life must be provided and if the income is small, barely enough to cover these needs, there is little choice left but to spend all for them. Yet as a matter of fact, choice is possible for most families. While a large wage-earning class are receiving smaller incomes than one would wish, at the same time we find choice playing an important role in determining the purchases of the day laborer, as well as of those who are not limited for money. In fact, it is with those who can least afford to be governed by caprices that the most pitiful lawlessness in these things prevails because of ignorance.

Real Values

Enlightenment through education in real values is needed by all alike, that correct divisions may be made and lived up to, and that the division for higher life, most often cut to a discredibly low per cent, may be recognized and properly provided for.

Budgets

The following table from *The Cost of Living* by Mrs. Ellen H. Richards gives some actual and typical family budgets:

Typical Budgets

Family Income Per Year.	Percentage for				
	Food.	Rent and Car Fares to and from Work.	Operating Ex- penses, Fuel, Wages, etc.	Clothing.	Higher Life, Savings, Charity, etc.
\$3,098, three adults, two children.....	27.5	21.1	16.8	10.	24.6
2,500 (Mass.), three adults, no children	25.	25.	13.	12.	25.
2,500 (Mass.), two adults, one child, much company.	32.	18.	18.	10.	22.
1,980 (St. Louis), four adults, two children	36.3	24.2	20.9	18.60	
950 (Mass.), two adults, three children	20.	19.	16.	15.	30.
630 (Boston), two adults (women), two children.	23.	26.	4.	5.	26.1 Travel, Sickness, etc. 15.9
535 (N. Y.), two adults, three children	55.2	22.4	5.3	9.4	7.7
312 "mean" Englishman, two adults, three children.....	55.2	15.5	8.9	13.1	7.3
300, Dr. Engell's estimates	62.	12.	5.	16.	5.
From <i>Cost of Living</i> , Mrs. E. H. Richards.					

From these budgets it will be seen that little choice is given the families of most limited means. The necessities cost about the same for all. It is in the range of luxuries that the greatest divergence is to be found. Only there can limitations be wisely set. In those where choice is possible, one observes a variety of results, showing that one family preferred to economize in one way, another in another. The comforts to be secured through increase of rent appeal to

Necessities
Uniform

one, those of additional service, another, and so throughout the list.

Extravagance

Extravagance is most frequently found in the Food and Operating expense divisions. Individual extravagance occurs most frequently in clothes.

**Ideal
Budgets**

With these actual and typical budgets in mind note the Budgets, as suggested by Mrs. Ellen H. Richards, which give the ideal *theoretical* division of incomes varying from \$500 to \$4000. The interest and profit to the housewife in the comparison of these widely differing standards will be the stimulus to keep systematic accounts, that she may be able to determine the percentages of her own family expenses. Such an account with its day of reckoning is an excellent moral support since one will learn to think twice over the temptation to spend for personal gratification, or for those things which have at best little to recommend them either for pleasure or profit.

Ideal Budgets

Family Income.	Percentage for				
	Food.	Rent.	Operating Ex- penses, Fuel, Wages, etc.	Clothing.	Higher Life, Book, Travel, Charity, Sav- ings, Insurance
Two adults and two or three children (equal to four adults):					
Ideal Division—					
\$2,000 to \$4,000.....	25	20 ±	15 ±	15 ±	25
2,000 to 1,000.....	25	20 ±	15 ±	20 ±	20
800 to 1,000.....	30	20	10	15	25
500 to 800.....	45	15	10	10	20
Under \$500.....	60	15	5	10	10
From <i>Cost of Living</i> , Mrs. E. H. Rich- ards.					

Four laws have been formulated by Dr. Engel, which state the tendency in the changes of per cents noted in such budgets as we have been considering:

DR. ENGEL'S LAWS

1. The proportion between expenditure and nutriment grows in geometric progression in adverse ratio to well-being; in other words, the higher the income, the smaller is the per cent of cost of subsistence.

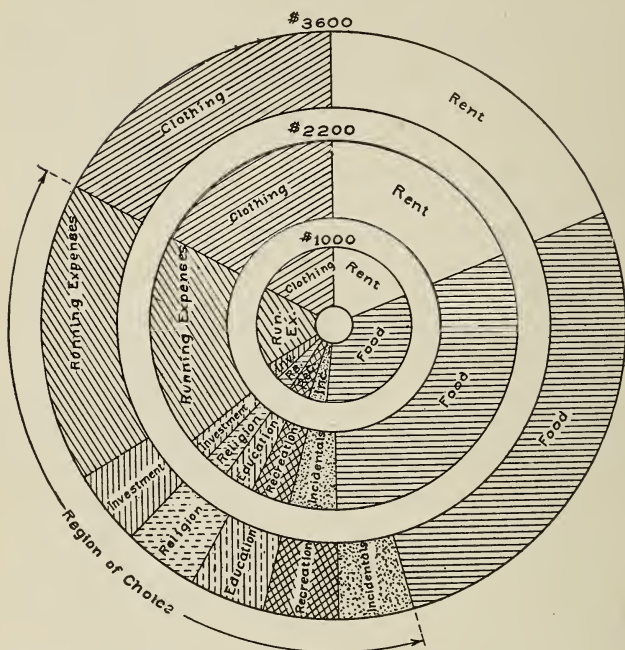
2. Clothing assumes and keeps a distinctly constant proportion in the whole.

3. Lodging, warming and lighting have an invariable proportion, whatever the income.

4. The more the income increases the greater is the proportion of the different expenses which express the degree of well-being.

HOUSEHOLD MANAGEMENT

DIVISION OF INCOME CHART
 Typical Family of Two Adults and Three Children



Running Expenses include Wages, Fuel, Light, Ice, Etc. With \$1,000 Income the Children Would be Educated in the Public Schools.

The above chart was adapted from a large colored chart prepared under the direction of Mrs. E. H. Richards for the Mary Lowell Stone Exhibit on Home Economics.

The classes of expenditure discussed in the following pages are those which, on the whole, best represent the different divisions into which money expenditure may fall. These are *Rent*, or its equivalent paid for shelter, *Operating Expenses*, such as fuel, light, wages and repairs, *Food, Clothes and Higher Life*. The latter includes all that ministers to mental and moral well-being, as education, travel, amusements, charities, savings and insurance. These will be considered in order.

Division of
Household
Expenditures

RENT

The question of buying or renting a house which shall offer shelter and make a home for the family is often a difficult one in these days. Formerly private possession was much more universal than at the present time. It is more or less impossible within a wide radius of the center of our largest cities to-day to buy a single house at any price. For this reason people are more and more forced to rent, and must share a house with other families, usually, either in double houses, apartments or flats. Many of the objections which are to be urged against boarding are equally forceful for this manner of living. The too close proximity of others is a misfortune, yet it is preferable to boarding, since some privacy and individuality may still be preserved. Some, feeling the natural instinct of ownership too strongly to be content to give it up so completely, will prefer to go into the suburbs and

Buying
or
Renting

rely upon electric cars or other means of transportation, for going to and returning from business.

Disadvantages
of
Buying

The difficulties which present themselves when one considers buying, may be summed up under the following heads:

1. Scarcity of available houses in places of any size.
2. Greatly increased cost, due to increasing valuation of property.
3. Tendency of fluctuating business, causing changes in plans or place of residence, necessitating the disposal of a house at a sacrifice.
4. Unforeseen changes in business centers in our rapidly growing towns, and cities, greatly affecting the desirability of the location for a home.
5. Constant expenditures required to keep a house in repair, often in excess of rent.
6. Decreasing tendency on the part of young people to have a saving fund which can be used or which they are willing to use for purchasing a home.

Advantage
of Ownership

The advantages of owning a home when it is at all possible or feasible, far outweigh these disadvantages. Renting tends to develop demoralizing habits of carelessness and indifference. The word "home" should have a meaning for us vastly deeper and richer than can be bounded by four walls, it is true, or than can be centered in material or outward covering, yet all such aids prove vital in developing and strengthening the highest regard for the name with children. The

man or woman is to be profoundly pitied to whose mind the name does not recall a definite and loved spot as the home of childhood.

Nothing contributes more surely and steadily to the development of a worthy citizen and through him of a worthy community than proprietorship in his home. It removes the temptation to move from place to place—always a great hindrance to the development of an ideal home. The family that rents tends to disregard property rights and to enter with less pride or concern into the neighborhood life. As soon as a home however humble, is acquired, a pride is taken in it and its surroundings and the sense of personal responsibility for the tone of the community is much keener.

In providing for shelter either by buying or renting, three factors should play a part, (1) sanitary requirements, (2) those things which, like location and architectural appearance, answer the social requirements, (3) and standards of living. Sanitary requirements may well be placed first. Money is well and economically expended which secures the best possible sanitary conditions. Failure at this point has cost many families far more than the two or three dollars' difference per month in rents by adding doctor's bills—most uneconomical of all expenditures—to the lowering of vitality and decreasing of efficiency.

Distinction should be made between essentials and non-essentials, between showy cheats and real worth.

Legitimate
Expenditure

Essentials
and Non-
Essentials

Bright gilding does not make good plumbing nor does an especially fine porch bespeak a carefully constructed cellar. Some of the principle requisites are: Ample air space for each individual, (300 cu. ft. for each person having been found to be the lowest amount permissible according to sanitary rules); light, fresh air and water in abundance. Drainage conditions should be above suspicion within and without. A house so constructed as to require the minimum of labor to care for is also a wise and economical consideration. The housewife will be surprised in her search for these requirements to find what poor provisions exist in most houses. The demand for the best sanitary conditions has been so slight up to the present time, that those who build have not found it essential to give them large attention, since selling or renting so seldom depends upon these things.

**Reasons
for Low
Price**

If a house is found which is offered at a price less than others which are similar in the vicinity, one of three reasons may be found to account for it. Either it is an old house out of repair, or is in an undesirable neighborhood, or it is simply cheaply constructed. In weighing its merits great care should be exercised to distinguish as to the cause. If it is such as to be a menace to health, physical or moral, one has no right to choose it. If it will cost more to put it in good condition to live in than the difference, or if operating expenses, as fuel, will be increased more than enough to offset the difference, then it is

poor economy to select it; but if the difference is merely one in incidentals such as more or less expensive woods for finishing, etc., then it may be wise to sacrifice a little at this point rather than in something more vital.

In building, the demands of modern life require, not including cost of land, an expenditure of about \$1000 per person, or \$4000 for the typical family of five persons. It is easy to vary this to the two extremes. In most localities, \$10,000 should build all that any family could use for themselves alone so far as *essentials* go.

Cost of
Building

The cost of building varies so greatly that no very definite estimates can be given. In parts of the United States where building materials and labor are high the cost of a house may be nearly double that in places where prices are low. The *recent* experience of others or the conservative estimate of a local architect or contractor is the only safe guide.

The difference in expense too often represents other than legitimate reasons: A large expenditure frequently represents bad taste and showy ornamentation rather than more abundant sunlight, fresh air and cleanly surroundings. A good rule to bear in mind is that "less should be spent for the mere house and more for what goes on in it—the real life."

In deciding what may be legitimately spent for rent one may safely estimate whatever is necessary to secure the requisites for health. It ought to be possible

Rental

to secure safe surroundings at a cost not exceeding 20 per cent of any income between \$500 and \$5000 a year, not including the expense of heating and lighting. If more than that is necessary, it is an indication that the sanitary standards in the community are not as high as they should be. As a matter of fact low standards which the individual alone is powerless to correct often force the expense to 25 per cent to secure safety.

**Location
and Rent**

The location of a house in its relation to place of business, school, etc., should be considered. If at a distance so that carfares are necessary these should be reckoned as a part of the rent. In considering the rent of a heated apartment about \$5 per month should be credited for the heat, in addition to janitor service and hot water if these are furnished.

OPERATING EXPENSES

**Supreme
Tests of the
Housewife**

Operating expenses consist, for the most part, of the necessary expenditure to keep a house warmed, lighted, clean and in repair. The skill with which these expenses are managed is the supreme test of the ability of the housewife, materially speaking. Other decisions may be turned off more easily or attended to once for all, and there is some end to them. In these the highest success can only be realized by the woman who has a genius for details, who will allow nothing to escape her consideration, yet who has the ability to carry them with a degree of ease and

mastery so that it will not be apparent to others, at least, that she finds them perplexing or burdensome. The over-anxious, wearied woman is as lacking in the element of success as the careless and heedless one. She may be able, through her greater watchfulness, to save more money, but family happiness is perhaps more endangered, through the depression of spirits and the friction which result, than in the other case. To remove friction and reduce to a harmonious unit are parts of what she must accomplish through the direction of the operating expenses.

Worry

The same standards should control in deciding the avenues of expenditure here as in selecting a house or deciding any of the other divisions. Health, comfort and happiness in the highest and broadest conception of these words should be the only factors having weight. Whether my neighbor has a maid should be nothing to me in my decision as to the necessity of having one. To be met at the door by a suitably attired official ought not to be as important as it would sometimes seem to be, in leading us to decide whether we have had a pleasant and profitable call on a friend. All these things are well in their place, but they are by no means so vital that one should sacrifice far more important things and magnify these out of all proportion.

Determining
Factors

Much of the necessary operating expense is determined when the house is selected, and the two should always be considered together. If the number of

rooms is limited, the expense of caring for them will be correspondingly less. If the house is conveniently arranged so that the work may be swiftly performed, the work of each helper will "go further" than if much time is wasted through unnecessary steps or movements. So, also, in the expense of heating. One should consider whether the house is arranged compactly or not, what the loss of heat through exposure of rooms will be, etc., so that the cost of heating can be correctly reckoned with.

Approximate
Cost for
Service

It has been estimated that, for an ordinary city house, the sum paid annually for wages of servants should be equal to one-half the rental value of the house. This can only be realized, however, by those who are willing to simplify their manner of living so as to reduce expenses more than the average at the present time, or by those who give assistance in the duties.

When servants are kept the cost of the other operating expenses will be increased without corresponding satisfaction. In general, they should be kept equal to the amount paid as wages. An excellent standard to keep in mind is the maintenance of the "maximum of efficiency at minimum cost." It is true economy to expend for what will remove friction or prove time-saving.

Wage

The wages of a general helper for housework vary according to location, from \$3.00 per week or less in some small towns in the East and through the middle

West to \$4.00 or \$5.00 in the larger cities. This must be doubled in allowing for board and room and for the additional outlay because of more wasteful cooking and more careless handling of furnishings. One housekeeper who kept a careful record of expenses both when with and without help, found the weekly expense from one-fourth to one-third more when help was employed.

The average cost of hiring by the hour for work done in the house is from 15 to 25 cents per hour including the midday meal, if the helper remains over that time. Laundry work for unstarched, flat pieces, averages 25 cents per dozen.

Hour
Work

When all the main avenues of expense have been carefully considered to eliminate excessive or unnecessary expenditure, there remains for the thrifty housewife the daily exercise of much watchful care over the "littles" which otherwise astonishingly run up the expense. A three-burner chandelier ablaze instead of one Welsbach burner which would give better light at less than a third the cost; a range fire opened, at the loss of at least a hod of coal, to prepare a warm dish for supper when the use of a gas or oil stove for a short time would accomplish the desired result much more cheaply; daily orders in piece-meal over a limited telephone service, because the difference is not considered sufficiently important to necessitate the thought required to combine all the orders for that day, or for several days, in one message: these are

Small
Wastes

all trifles in themselves, but five cents here and ten there make a surprisingly large difference in the sum total. The difference between skilful, thoughtful outlay and careless spending, is to be measured in the added comforts to be secured by the one who learns the secret of successful management in this group of expenses.

FOOD

The influence of food upon the welfare of the household must be first considered in apportioning the share of income rightly devoted to it. In referring to the budgets we find that as the income decreases the percentage devoted to food increases. Why is this, or why should it be so? It is because the life of the individual depends upon his nourishment. His shelter may be poor, his clothing inadequate for his needs, but food he must have and upon proper food depends his capacity for doing work and doing it well.

Proper Food

The child must be properly nourished that it may be a strong little animal, growing into healthy happy youth. The adult must be well nourished to be an efficient member of the community, whether as a wage-earner or as a household spender. The food supply must be right for errors and wrong doing here show their effects in a weakened power to perform work or resist disease. In this lies the justification of the poor man who possibly spends two-thirds of his income for food.

The wide variation, however, as shown in the budgets, does not indicate proper nourishment in one case, improper food in another. Over-nutrition is often as dangerous as under-nutrition and the cost of food does not determine its nutritive value. It by no means follows that because a family has large butcher's and grocer's bills it is therefore better nourished. The same causes affect the cost of foods as influence the price of other commodities. The demand for and scarcity of any article; being in or out of season; cost of transportation; loss through waste in foods that deteriorate quickly; fancy price asked for certain rare flavors, all these determine price outside of any consideration of nutritive value.

Sources
of Wide
Variation

Bullock gives five ways in which he estimates that one-fifth of the money expended for food is actually wasted.

Waste of
Money
in Food

1. Needlessly expensive material, providing little nutrition.
2. A great deal thrown away.
3. Bad preparation.
4. Failure to select rightly according to season.
5. Badly constructed ovens.

In 1900 when Mrs. Richard's book on *The Cost of Living* was published experiments in dietaries were made and the cost of the raw material required for so many persons a day estimated. The conclusions reached at that time were that twenty-five or thirty cents per person a day is ample to supply all the

Cost per
Person

physical demands of one whose tastes have not been perverted by wrong habits of eating. Good, substantial living, meeting all the needs of people of simple habits, can be secured at less than that. When the expense exceeds that sum it is due to one or more of the following reasons:

**High Cost
of Food**

1. Waste.
2. Buying out of season.
3. Choice of food of which there is a limited supply therefore price is high.
4. Perishable food stuffs.
5. Fads or fashions in dishes.
6. High priced products because of choice flavors as "Gilt Edged Butter," or food which is "in season" but a short time, as venison.

Since the year in which the experiments and investigations were carried on certain staple food stuffs have increased nearly twenty per cent in price, so that the margin for the same bill of fare now should be wider, or from twenty-five to thirty-five cents per person a day.

**Sources
of Waste**

The housewife should carefully consider these estimates and the causes most fruitful of waste in the household. Far too lavish provision is often made in ordering. Study and observation must be given to the necessary quantity of meats, vegetables, etc., to be provided and served. Large portions are left to be improperly warmed over, wasted in the kitchen, or thrown away altogether. Waste in the household arises mainly

from lack of thought, planning, or carefulness in detail, just as in any other business. A study of foods and food values is necessary in order to know what less expensive material may be provided to supply the same need, but above all else must the housewife who desires to make a study of these things, and reduce the waste in the household realize that no waste is greater than poor material, illy prepared. The more knowledge, the more science used in the selection and preparation of food for the table should mean more, not less appetizing results.

It is of course easier to provide a good table for eight people on \$2.40 per day than for four people at \$1.20. It must be remembered that many people live well on less; many more are well nourished on much less.

Numbers

The pecuniary economy of food is seen in the accompanying charts, and those articles which would be classed under unnecessary expense may be easily separated from the more legitimate.

Of course the price paid for food cannot be regulated entirely by a consideration of nutriment alone. It must satisfy aesthetic demands as well. Food must be enjoyed in order to be thoroughly well digested. This is a strong argument in favor of a moderate use of animal foods. Although vastly more expensive than vegetable foods, they do gratify the palate of most people in ways which vegetable foods do not. This fact together with their superiority in being more

**Aesthetic
Demands**

Chart of Composition of Foods

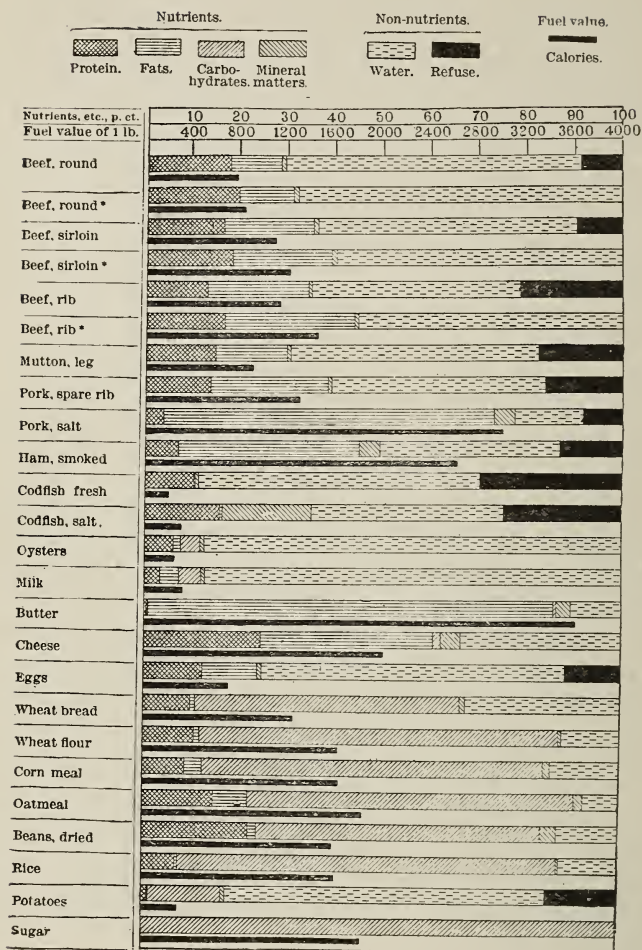
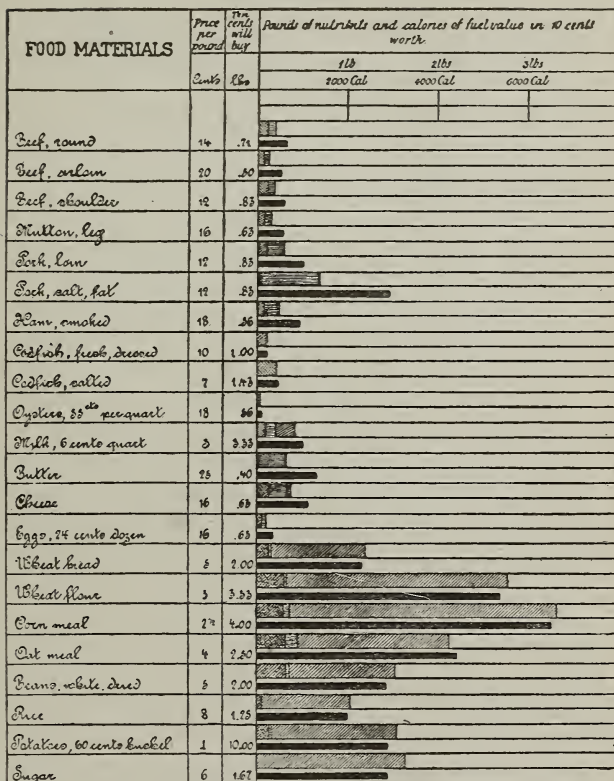


Chart of Pecuniary Economy of Food

Protein. Fats. Carbohydrates Fuel Value.



From Farmers' Bulletin, No. 142.

easily and completely digested are valid reasons for paying somewhat more for the sake of securing them.

CLOTHING

Real
Purpose

Clothing, like food, should be considered first of all in its relation to the possible increase of health and efficiency. Like the function of food, this is too much lost sight of at the present time while the aesthetic side of the subject is receiving an undue share of emphasis. The cost of clothing is too largely the result of an attempt to gratify the desire to please the world at large, rather than of protecting the body. We all know too many instances of the rashest excesses to which this may lead, destroying all hope of realizing higher and worthier ideals. A safe-guard to such excess lies in an intelligent training and thoughtful study of these things.

Legitimate
Expenditure

Sufficient and suitable protection from clothing, so that one is enabled to meet the varying changes of climate without loss of energy, is a distinct advantage, offering grounds for reasonable expenditure. This should debar either too scant provision, or too great excess, which weakens power of resistance. The aesthetic has a legitimate place in the consideration, but should be subordinate to health, if the two ever seem to conflict. There is, as we know, the greatest possible difference in people in ability to "make a little go a long way" in providing satisfactorily for clothing. Knowledge and care will aid greatly in helping

one to conform to the laws both of health and beauty. A pleasing, becoming color or style is little, if any, more expensive than one which is unbecoming. One should seek to develop true individual taste and expression, relying less upon the not infallible dictum of dress-makers. To secure clothing, then, which shall be a protection from heat and cold should be the first motive. Along with this should go a recognition that the outer garments may be and should be a means of contributing to the pleasure of others, through a correct selection of pleasing colors and graceful forms. Both these may be entirely legitimate considerations, but there should not result, from over emphasis, a dwarfing of the more important things in life.

Good
Taste

HIGHER LIFE

The preceding divisions have to do chiefly with those things which support and protect the physical well-being. The fifth important provision should be for the higher life, or the demands of the intellectual and spiritual nature. The most important business of any life is to develop this side to its highest possibilities and to find its fullest expression. Other considerations are in reality subordinate to this.

Necessary
Consideration

Unless a definite allowance is set aside for the purpose material demands encroach until all is spent. Even if something more is realized each year than is spent, the money itself seems too often to be the most valuable possession, rather than the comforts and

Value
of Definite
Allowance

aesthetic ideals which it might secure. It is a battle, in these days of materialism, to reserve one-fourth of an income for the satisfaction of the needs of the higher nature, yet there is no greater need in our nation than that of more families who realize the imperativeness of doing it, and who independently insist upon proving it to be possible. Those who resolutely decide upon this course tend to more refined living, give "more thought to the meaning of life, to the object for which all exertion should tend, more thought for the manner of accomplishing a given result, less for the money value of it."

Realizing
Ideals

It means making a place for ideals, recognizing their necessary place in life, and resolutely setting one's face toward realizing them. Such a purpose serves as an admirable check to the gratification of lower desires and unnecessary spending, while whatever is found to be necessary and worthy will have a double value because of the thought and care exercised in the decision.

Wide
Range

There is a very wide range possible for different tastes in ministering to the higher life. One will prefer travel, another literature, a third art, while church and charity must find place in all higher life. It matters, perhaps, less what particular side is developed than that there shall be *conscious effort toward a higher and a fuller life*, and that *choice* rather than idle *drifting* rules. It is true that all altruistic motives which look to the good of another, be he kin or other-

wise, are more full of elevating influence upon a life than those which seek merely one's own highest good. One should gain the habit of choosing those things that endure, and have abiding value rather than those of momentary or temporary advantage.

Even when guided by an impulse to make provision for one's family, it is to be borne in mind that the best possible investment which can be made for a child is a liberal education. All that anyone in normal health and strength should need is a thorough preparation to do his or her work efficiently, with motives toward the best things which life has to offer and the possibilities of a better life than his parents have had. Too liberal provision is often seen to destroy incentive and the things of highest value are cheapened when they cost little effort. Progress can only be made through striving. Conscious effort is as necessary for the health of mind as for health of body. For this reason it is best that what we enjoy should be the result of choice and denial, and we should learn early to pay for what we get. A surplus should be reserved against emergencies, that a feeling of independence may be fostered, yet this should not be insisted upon to the point of crippling life.

As to ways of saving, the field is large. Some methods employed at the present time are to be commended in highest terms. Against others too severe condemnation cannot be passed. Among those forms which are safe may be classed life insurance, savings

Wise
Investment

Ways of
Saving

banks, loans on real estate and investments in stocks and bonds.

In selecting, one should consider whether the business which the company is transacting is legitimate and also whether it is probably permanent because it serves a real public use with elements of growth and lasting development, or whether it is merely a "flash in the pan" scheme. Again, it is important to know whether the company has sufficient capital to make the business a safe one, and whether the management, so far as can be determined, is wise and honest.

**Life
Insurance**

Life insurance is becoming an increasingly popular form of saving. With a reliable company, and under some of the favorable arrangements possible at the present time, such as terminal endowment policies, yielding a fair interest for money invested, as well as insurance, it is without doubt one of the best methods. Some find the imperative demand to meet the annual payments a very helpful check upon expenditure. There is not the risk of loss through failure to pay at any time which formerly existed, since, in emergencies, money can be loaned on the insurance or one can secure at some sacrifice the return of the amount paid in.

**Railroad
Securities**

Railroad securities are possibly first in value, such bonds, if good, being unquestionable security and yielding good return. There is little fluctuation in value, and the reports are frequent and controlled by

state law, so that one may know the exact condition of the investment at any time.

Loans on buildings, or real estate are excellent forms of investment, if one knows beyond question the value of the property secured. These may not be as readily transferred or their value realized, as with stocks and bonds.

In general it may be said that for the ordinary investors in our country any investment yielding over 4 1-2 or 5 per cent is to be classed as a risk, and is not consistent with sound finance. A safe investment yielding that return is far wiser than a questionable one promising more. A high interest rate is almost invariably, in the very nature of things, a warning of insecurity. Shrewd capitalists of the country are certain to know of any especially favorable opportunities and seize upon them, if desirable, so that the small investors should not look for phenomenal returns.

The frequent reports of failures, and cases of those involved who have met with pitiable losses emphasizes the danger and evils of speculation. These often rise in the form of local crazes, with heated booming for a short lived career, or as investment in some gold or copper mines at too great distance to be personally investigated. These should be condemned and avoided as almost without exception dangerous. Women are found to be particularly susceptible to such alluring opportunities to "get rich quick" because of failure in training in sound business principles.

Mortgages

**Safe
Interest**

**Get-Rich-
Quick
Ventures**

HOUSEHOLD ACCOUNTS

Value
and Necessity

The management of the money affairs of a family is usually the most perplexing part of its domestic problem. Yet, in spite of this fact, the least candid study and thought are given to it. The value of accurate accounts, as well as their necessity, is recognized in the entire business world. Few associations of individuals are organized for any specific purpose without careful regard to the maintenance of the proper relation of income and outgo. The value and importance of this is no less to the housekeeper than to the banker or grocer. The appallingly frequent examples of reckless disregard in this respect, leading to a constantly increasing number of unpaid bills and final ruin, ought to teach the sad lesson of the unthrifty. Yet statisticians tell us that at least one-half of our well-to-do families are seriously handicapped by debt. Along with that fact should be emphasized another—the number of families in which accounts of personal and family expenses are kept is astonishingly small, and in few instances where such records are kept is sufficient study given to them to lead to advance in standard of living from year to year.

What
Accounts
Should
Show

In conducting any business it is of the greatest importance (1) to follow the receipts and expenses, (2) to keep a record of investments and (3) to determine at the end of the year, or shorter period, the results of the business and the exact condition of the

capital. The modern household is an intricate business concern. Its financial administration demands as perfect exactness, order and method as any other, if it is to attain in any degree its possible efficiency. Such exactness alone renders the accounts of any real worth. They may be made of priceless value in directing the activities and ministering to the comfort of all in the home.

The question who shall be head bookkeeper and director of the household expenditures will probably be best decided by determining which grown member of the family has a genius for accounts. It naturally falls to the housekeeper as the one who can manage best and has the most intimate acquaintance with the entire situation. In any case, it should be one who loves it or who sees in it possibilities large enough to create a willingness to give the necessary thought and time to make it a success. It has been made a profitable and interesting business training in some families for growing boys and girls. Possibly promotion from the keeping of their own personal accounts to those of the household might be made an excellent stimulus. With a clear, convenient system, adapted to the needs of the particular records to be kept, and with a business-like promptness in entering each night the transactions of the day while fresh in mind, what is often looked upon as a perplexing hardship may become an interesting study. A helpful aid to memory is a card neatly fitted into the purse, upon which sufficient entry

The
Account
Keeper

may be made at the time of the expenditure to assist in recalling the details when they are wanted for entering in the account. A shopping list filled out with prices as one purchases is a useful aid to memory.

Systems

The system employed in keeping the accounts may be very simple. The only necessary requirement is that it be sufficiently complete to record in concise, available form the necessary facts to indicate clearly the details of income and outgo. It must be possible to compare these two sides of the account at any time in order to prove that the balance as shown by the account corresponds with the cash on hand.

Various systems have been devised and successfully used. The efficiency of anyone depends quite as much, perhaps, upon the thorough, painstaking effort of the user to bring it to its utmost point of efficiency and utility as upon the system itself.

Envelope Method

Some find a series of envelopes a very convenient form of keeping the records. Each envelope is labeled with the name of the particular division of the expenses which it is to hold. After it has been decided what proportion shall be spent for each division the sum is put into its envelope, to be drawn as needed.

A slip of paper or card in the envelope records each addition, and the expenditures from that envelope during the week or month, or a cash account is also kept of the household expenses and personal account. Any division like the following may be made with the envelopes :

Suppose a family consisting of a man and wife live in a steam-heated flat and have an income of \$30 a week. The following divisions might be made each week:

Example

Rent.....	\$7.00
Household expenses.....	7.00
Fuel and light.....	1.00
Man's personal allowance and expenses, including lunches and car fares.....	5.00
Madam's personal allowance.....	4.00
Extras and emergencies, including dentist, doctor, etc.....	2.00
Church and charities.....	1.00
Insurance and savings bank.....	3.00
	<hr/>
	\$30.00

For amusements there may be a separate envelope, or, as there are four months in which there will be five payments to the envelope, these extra four payments may be used for amusements in connection with household expenses.

A system like this has the advantage of keeping always before one just what is at hand to draw from. The leading disadvantages over other methods is its cumbrousness. It involves the keeping of a considerable amount of money on hand and also presents a great temptation to borrow from one envelope to another for making change, etc., which is likely to lead to confusion of accounts.

Advantages
and
Disadvan-
tages

Cards
and
Envelopes

If the records for the envelopes were kept on cards, these might be filed in a card index for comparison and permanent reference as explained later.

On the whole, a system by which the accounts are finally entered in books intended for that purpose proves most satisfactory. Such books may be procured already ruled for entries, or a blank book can easily be ruled as desired. For a complete record the same books are useful as for other accountants—a journal, ledger and balance sheet. The journal and ledger may well be combined in one book, as will be explained in connection with Table III.

Journal

The household account records exchanges whereby the housewife buys the goods or services which her household needs, giving in exchange of her means. The simplest statement of such exchanges is made in a journal. A single page is used to enter both receipts and expenses. Thus:

TABLE I

1904.		Received.	Paid.
Jan. 1	Cash in hand.....	\$20.00	
" 2	Washing.....		\$1.50
" "	Grocer.....		8.00
" 3	Coal.....		14.00
" "	Flour.....		4.75
" 5	Salary.....	50.00	
" "	Car fares.....		.50
" "	Cleaning.....		1.25
" 8	Eggs.....		1.10
" "	Washing.....		1.50
" 10	Potatoes.....		1.70
		\$70.00	
		34.30	\$34.30
" "	Balance on hand.....	\$35.70	

If purchases are itemized elsewhere for reference, such an account as this may contain sufficient data. It is possible to itemize more fully in this journal record if desired, as is illustrated in Table II.

Itemized
Accounts

TABLE II

1903.		Cr.	Dr.	Daily Totals.
Feb. 1	By balance brought forward	\$75.70		
" 2	To washing.....		\$1.50	
" "	" 2 tons coal at \$7 per ton		14.00	\$15.00
" 3	" 3 bu. potatoes at 80c. per bu.....		2.40	
" "	" 5 doz. eggs at 22c. per doz.		1.10	3.50
" 5	" cleaning one day.....		1.25	
" "	" rent for January.....		15.00	
" "	" 8 lbs. beef at 14c. per lb.....		1.12	17.37
" 8	" washing.....		1.50	1.50
" 10	By salary	50.00		
" "	To car fares.....		.60	.60
	Totals.....	\$125.70		\$38.47
	(Balance, \$87.23.)			

In the second table it will be noted that the terms usually employed in bookkeeping are introduced. These are easily understood. The term "By" introduces all terms belonging to the credit or receipt column; the "To," items of the debit or expense column. The abbreviation "Cr." for credit heads the column of receipts, indicating that the house account has that much more to its credit, while the "Dr." abbreviation for debit shows to what extent the house has become indebted or has placed itself under obligation for benefits received.

Terms

Table II also includes a column for daily totals, which carries the account a step further in efficiency. In the final footing up of the columns these totals are

Daily
Totals

a convenience, since it is always easier to add a short list of large figures than a long column of small items. It is sometimes helpful also to be able to refer to the entire day's expenditures.

**Use of
Ledger**

As will be readily seen, the details of expenditures, when entered as above in the journal, are not easily referred to. One could at any time make a summary of any division which would show the amount spent for any one class of purchases, as clothes, rent or food. As a matter of fact, few seem to make such reviews when the accounts are kept in this way, finding it a seemingly endless task to assort the different items after they have become so thoroughly confused as they do in the journal account. In this way the greatest benefit of an account is lost. Their highest value is in one's being able to bring each set of expenses together, so that comparison of different divisions may be made, and a proper proportion maintained. It is far better to transfer the details of an account to a second book, called a ledger, which may for convenience be divided into sections, each devoted to its particular class of items.

**Credit
Accounts**

The number of credit accounts should be limited to as few as possible, usually to grocer, butcher and doctor. Frequent settlement of such accounts should be made. The family physician has too frequent occasion to comment upon the unbusiness-like way that family bills are allowed to accumulate from year to year without attention. If a physician is tardy on his

side and does not present bills promptly he is usually agreeably surprised to have it called for, as it should be.

The most complete and concise way of recording the facts to be preserved is to be found in the combination of journal and ledger, such as is illustrated in Table III. This will prove in the end to be one of the most convenient, suggestive and helpful arrangements yet devised. Opposite pages of an account book may be used, the left-hand page for the journal record, the right-hand for the ledger. The ledger items are classified under a few typical heads and the amounts expended for each are entered apart from the whole. This renders it very easy at any time to consult any one division, where all the record is clearly before one. The divisions used correspond to those suggested in the discussion of Division of Household Expenditures, page 21. These are optional both in character and number, but will in the main prove to be excellent general heads. Others may suggest themselves as desirable for an individual family. Multiplication of details must be avoided as far as possible, to avoid confusion. Particulars as to prices paid may well be left to the pass books or bills of butcher or grocer, or in a separate memorandum book.

Combination
Journal
and
Ledger

TABLE III

Date of Receipts and Expenditure.	Receipts.		Expenses.	Sum.	Daily Total.	Food.	Car Fares and Rent.	Operating Expenses.	Clothing.	Higher Life.
	Sources	Sums.								
1905.										
Jan. 1	Cash in hand.	\$90.00								
" 2			Flour	\$4.75		\$4.75				
			Dress Ma- terial....	6.00					\$6.00	
			Meat	1.25		1.25				
			Coal and Oil.....	7.50	\$19.50			\$7.50		
" 3			Eggs	1.10		1.10				
			Car Fares.	.20			.20			
			Washing..	1.00	2.30			1.00		
" 4	Salary	150.00	Rent	35.00			\$35.00			
			Car Fares.	.40	35.40		.40			
" 5			Groceries..	3.25		3.25				
			Meat	1.10	4.35	1.10				
" 8			Churc Collect'n.	1.00	1.00					1.00
	Total.	\$240.00		\$62.55	\$62.55	\$11.45	\$35.60	\$8.50	\$6.00	\$1.00

Memoranda

In carrying on weekly or monthly accounts with butcher, grocer or at dry goods stores various methods are employed for keeping a memorandum of the character and size of purchases made. If slips are sent with the goods when delivered they should be preserved on file, to be compared with the bill when rendered. Pass books are sometimes used. In that case the entries should be made in the presence of the purchaser, to avoid error or deception.

Balancing

Household accounts should be balanced at least every week. A daily verifying with cash on hand is

easiest and saves time in the end. These daily balances may be indicated in pencil as the aim is to prove the account to be correct, thus showing that no item has been omitted. Every month's accounts should be balanced on the last day of the month and a new page opened for a new account for the next month. The first item on the new page should read as in Table II, "By balance brought forward——"

One should set a time for the final balancing of accounts and opening a fresh record. This is usually done at the close of the calendar year, although another time might be more convenient, as the holiday season brings other extras demanding time.

**Yearly
Balance**

The facts to be preserved on a balance sheet are available after this summary of the year's expenses is made. The purpose of a balance sheet is to preserve from year to year a statement of the final condition at the end of each year for helpful comparison. It may be that the income has not been sufficient to meet the demands upon it, when a deficit will appear. Or the income may be just enough to cover expenses, or there may be a balance of the credit side. A properly managed household will show a steadily increasing gain of this nature, provided no exceptional and unexpected bills arise such as result from long illness and the like.

**Balance
Sheet**

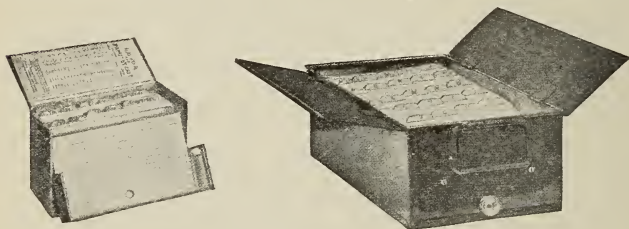
An example of a properly managed entry and a satisfactory showing is given in Table IV.

TABLE IV

	Cr.	Dr.
Income for year 1902.....	\$2,500	
Expense for year.....		\$2,250
Balance in hand.....		250
	\$2,500	\$2,500

Card Index
System

The household accounts may be kept by means of the card index system, which is perhaps the best method of keeping any and all sorts of records, such as addresses, invoices and miscellaneous memoranda.



CARD INDEX BOXES.

A small linen or pasteboard box containing a set of alphabetical guide cards and some two hundred ruled cards in sizes 5x3 or 6x4 inches may be purchased for from fifty cents to a dollar. These cards are ruled horizontally and perpendicularly as in a cash book, or come without the perpendicular rulings. Various systems may be used. The most concise and

simple is invariably the best, and it may be so done as to make further entering in a book superfluous.

One plan now being used is as follows: Under the letter *C* in the alphabetical index are three cards for

Typical
Method

1905 JAN.	CASH RECEIVED	
1	Cash on hand	51.64
6	Salary	80.00
16	From J.M. 3.00 sale of books	14.00
23	" Magazine Nov. Article	7.50
FEB.		153.14
6	Salary	80.00
20	Extra work for Sterling	10.00
		243.14

CARD CASH ACCOUNT.

cash, (1) an account of cash received, (2) an account of cash disbursed and (3) the cash balance. It may take a card for each month for Cash Received or not, depending upon the items. In the case cited the number of cards used during the year for Cash Received was six, two months on each.

Cash disbursed takes at least one card a month, possibly more if there are many classified accounts. The items on this card are the totals of items on single cards devoted to daily or less frequent purchases. That is, under the letter *R*, as indicated by the index at the

Cash Paid
Card

right on the Cash Disbursed card, illustrated, is found the card "Rents" with record of rental payments, when, to whom, and how paid, if by check or cash. Marketing includes both the grocer's and butcher's accounts, hence the index letters *G* and *B*. These are itemized

1905 JAN.	CASH DISBURSED.			
1	Rent	Under R.		16.50
2	Gas	" G.		1.70
4	Milk.	" M.		2.80
31	Services { Laundry cleaning	" L & C.		6.00
"	Supplies	" S.		2.14
"	Car fair	" C.		3.35
"	Personal	" P.		8.00
"	Incidentals	" I		1.25
"	Marketing	" G & B & V.		22.62
				64.36

CASH PAID CARD.

on the cards "Groceries" and "Butcher." If the accounts are heavy it would be better to devote three cards to these items divided into groceries, meats, and vegetables.

The illustrations will probably make the divisions clear, but these divisions are not arbitrary, the person keeping the household accounts can adapt her own system.

Bank
Account
Card

If the housekeeper has a bank account a card should be devoted to this to check up with bank book and

checks cashed and used for cash. This card should be as follows:

1905 JAN.	BANK ACCOUNT	
1	<i>on hand</i>	582.16
	<i>Deposited in January</i>	80.00
		662.16
FEB.	<i>Drew checks as per book</i>	33.62
1	<i>On hand.</i>	628.54

BANK ACCOUNT CARD.

With this card system a weekly balance may be kept instead of the monthly balance as illustrated. The accounts are so arranged that items may be found or traced with ease. For instance if in comparing the January expenditures on the Cash Balance card, it is found that it is much more than for February, it is desirable to know *why*. We take the two cards of Cash Disbursed, the one for January and the one for February and compare the items. There it may be found that the gas bill in January was more than in February, that more car fare was used, and evidently some extra supplies purchased. By turning to the card devoted to Supplies, these may be noted and the extra amount used at once found.

Balance
Card

Advantages

The entire account, daily, weekly and yearly, is in compact form and if mistakes occur it is a more simple matter to destroy and make a new card than to fix a book. Like any system of keeping accounts to be accurate and helpful this one demands promptness and accuracy in putting down items.

Filed for Reference

In order to be of use from year to year in comparing the increase or lessening of expenses the accounts must be filed away for reference. A set of cards takes up not more than six inches in length, four in height

1905 JAN.	CASH BALANCE (MONTHLY)	
1	<i>On hand</i>	51.64
JAN.	<i>Received</i>	101.50
"		153.14
"	<i>Spent</i>	64.36
FEB. 1	<i>On hand</i>	88.78
"	<i>Received</i>	90.00
"		178.78
"	<i>Spent</i>	53.42
MAR. 1	<i>On hand</i>	125.36

CASH BALANCE CARD.

and less than two inches space in thickness. The entire set can be put in a desk drawer or pigeon hole ready for easy reference. Or if preferred a small tin or wooden box designed for such purpose and made the exact size, may be purchased for the filing away of the year's accounts.

Unless desired for some special purpose it is not necessary to save the entire itemized account for the year, for the weekly or monthly grocery, butcher's, gas, milk and other accounts may be brought together each on a single card and kept with the cards devoted to the cash and bank accounts for future reference.

1905 JAN.	GROCERY (ACCT. WITH KOLBE)	
4	3 Doz. eggs @ 32.96 54¢/15	1.11
6	1 Bottle vanilla .15 6 lemons .15	.30
7	4 Lbs. Coffee	1.40
10	1 Box Domino Sugar	.50
11	4 Lbs. butter 32	1.28
13	10 Lbs. granulated sugar	.60
16	3 " lard .30 1 bu. potatoes ⁶⁰	.90
17	12 Oranges	.35
		5.94
18	Paid by check. No. 421	

GROCERY ACCOUNT CARD.

The chief disadvantage of the card system outlined, in comparison with the book system, is that the cash balance on hand is not so easily ascertained.

In any system, it is necessary to compare frequently the amount of cash actually in the purse (or purse and bank combined) with the balance as shown by the accounts. If this is not done there is usually an unaccounted for shortage which must be charged to "sundries," "miscellaneous," and the like—a most unsatisfactory procedure.

Necessity
of
Balancing

Classifica-
tion

Alcott Stockwell, in discussing "The Keeping of Household Accounts" in the April, May and June (1904) numbers of The Home Science Magazine, gives three tables of classification which may be helpful in suggesting headings for divisions of expenditure in the accounts. These are as follows:

TABLE I

Classification of Household Expenses.

- | | |
|--------------------------------------|--|
| 1. Housekeeping | b. Kitchen and Dining-room |
| a. Provisions | 3. Library Supplies |
| b. Ice | a. Books and Periodicals |
| c. Fuel | b. Stationery and postage |
| d. Rent | 4. Miscellaneous |
| e. Domestic Service | a. Sundries (expressage, flower for house, thread, etc.) |
| f. Miscellaneous | b. Other (fire insurance, moving, telephone service, etc.) |
| 2. House-furnishing | 5. Gifts |
| a. General (including all furniture) | |

TABLE II

Classification of Personal Expenses (in family).

- | | |
|--|---|
| 1. Clothing | b. Entertainment (may include anything as medium of diversion, as amateur photography, musical instruments, etc.) |
| a. New clothing, Foot wear, and Furnishings | 5. Education |
| b. Repairs to clothing and Foot wear | a. Books, Stationery and Supplies |
| 2. Transportation (street car, railroad, hack fares, etc.) | b. Tuition and Lectures. |
| 3. Personal Services | 6. Miscellaneous |
| a. Toilet | a. Sundries (soda water, confectionery, cigars, etc.) |
| b. Medical | b. Other (any large expense not included) |
| c. Dental | |
| 4. Recreation | |
| a. Outings (including bicycle, pony, canoe, camera and supplies, etc.) | |

TABLE III

Classification of Personal Expenses (single individual)

- | | |
|---|-----------------------------------|
| 1. Clothing | b. Entertainments |
| a. New Clothing, Foot wear, and Furnishings | 7. Education |
| b. Repairs to clothing and Foot wear | a. Books, Stationery and Supplies |
| 2. Board and Lodging | b. Tuition and Lectures |
| 3. Transportation | 8. Miscellaneous |
| 4. Personal Services | a. Sundries |
| a. Toilet(shampoo, manicure, chiropodist, etc.) | b. Others |
| b. Medical | Total Expenses |
| c. Dental | 9. Gifts |
| 5. Library Supplies | 10. Investments |
| a. Books and Periodicals | a. Bank |
| b. Stationery and Postage | b. Other |
| 6. Recreations | 11. On hand at end of month |
| a. Outings | |

In following these headings it would be well for Table I to include a division for investments, unless a separate small account book is left for these with such heading as:

Division
for
Investments

- | | |
|-------------------|----------------|
| a. Savings Banks | c. Real Estate |
| b. Life Insurance | d. Loans |

Charities and Church may be classed under gifts or investments, preferably the latter, as they indicate within proper limits the most commendable form of investment.

THE BANK ACCOUNT

Advantages

Comparatively few women appreciate the advantage and convenience of having a bank account. There is a mistaken idea current that banks are solely for those who have a balance to invest. This is true only of savings banks; with this exception, the housewife may select the most convenient bank of whose financial soundness she is assured and open her account. In this way the bank becomes merely a temporary safe deposit vault, and checks, the easiest and safest way of making all except small cash payments.

Pass Book

Having become identified, with her account accepted, the depositor is presented with what is called a *pass book*. This she keeps and presents with each amount of money to be deposited. The receiving teller makes a record of each deposit on the left-hand page of this book, and when the book is balanced from time to time a statement is inserted, on the right-hand page, of the amount drawn out and the balance remaining.

Deposit Ticket

In depositing, the housewife or her messenger fills out what is known as a *deposit ticket*, which is always to be found provided at the bank. If it is necessary or more convenient at any time to send the deposit by a messenger he should always fill out this blank in the name of the depositor, since it is not necessarily her signature, but merely a record of her deposit. If there be checks to be indorsed before depositing, that is a different matter. Those must be indorsed before delivering them to the messenger, and should be made payable to the bank; they are then payable only to the

bank. The deposit ticket is a printed form indicating deposits in specie, bills and checks. Sometimes the ticket reads for gold and silver, instead of specie, as is seen in the following form, illustrating a deposit ticket properly filled out for presenting to the receiving teller. This is handed in with pass book and deposit at the window marked "Receiving Teller," where the deposit is counted and the amount compared with the depositor's figures, checks examined to ascertain whether they have been properly filled out and indorsed and, last of all, the amount of the deposit is entered in the pass book, which is returned to the one presenting it.

Checks, drafts, money orders or express money orders can always be sent by mail for deposit with safety if properly indorsed.

DEPOSITED IN THE
**Union Savings Bank
 & Trust Company.**

By: Harriet B. Couch

Morrisville, N. Y. Sept 10 1905

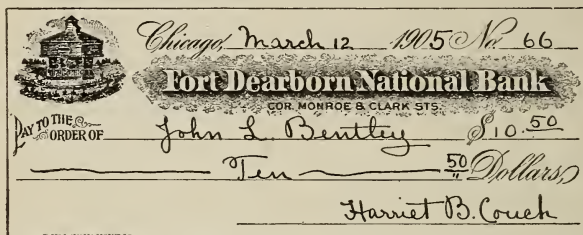
PLEASE LIST EACH CHECK SEPARATELY.		
	Dollars	Cents
Bills	20	00
Gold		
Silver		40
Checks		
<u>Maldenester Co. Nat.</u>	15	00
<u>First Nat. Hartford</u>	25	00
Total \$	60	40

Deposit Ticket Properly
Filled Out.

Depositing
by Mail

Checks

Every depositor is presented with a check book. This is a book of blank checks, arranged either several on a page, attached by a perforated line to a side, which is called a stub, or, as in "pocket" check book, with a single check forming the page. In this case



A CHECK FILLED OUT.

pages are inserted between each second and third check, or between every check, upon which a record may be kept, as upon the stubs. A check is a written order, dated and numbered, directing the bank in which the writer's money is deposited to pay the sum stated to the bearer of the check, some person named, or to the order of the person indicated.

This check is equivalent to the sum of money named upon it anywhere the rightful bearer presents it. It may be deposited, presented in payment of bills or cashed upon being indorsed.

Indorsement

To receive the money on a check it is necessary for it to be indorsed by the person to whom it is made payable. To indorse a check properly it should be held by the upper left-hand corner, turned and the

name written across the back about on-third down the length of the check. Other indorsements should follow the first, in order. The signature used in indorsing a check should always conform *exactly* to that on the face, even if that should by mistake be not correct. The simple signature across the back makes it possible for *anyone* to draw its value who may come into possession of it. For the sake of safety it is always well to limit the payment by making it payable to the order of anyone to whom it is desired to transfer it. It is best to observe this under all circumstances, unless one presents the check in person for cashing, or must send it to be cashed by someone not known. It makes it impossible for it to be of any value to a chance finder should it be lost. Thus:

John L. Bentley

Simple Indorsement.

*Pay to the order of
Henry E. Johnson
John L. Bentley*

Safe Indorsement.

Sometimes a check is made out so that the payee's name differs from that used in the bank. This will happen frequently with married women. In such case it is usually necessary to sign both names. For example, a check made payable to Mrs. Henry Couch would be indorsed "Mrs. Henry Couch," followed by the proper signature, "Harriet B. Couch" underneath, since the given name of a depositor is preferred at the bank.

Double
Indorsement

If for any reason one desires to draw cash on her own account it may be done by making out a check, using the word "Cash" or "Myself" in place of other name.

Vouchers

A check eventually returns to the depositor's own bank, is paid, cancelled and returned to her when her pass book is balanced, as a voucher or receipt of payment. The vouchers are perfect receipts of all payments made by check.

Overdrawing

Care must always be exercised not to overdraw in checks the amount of one's deposit in the bank. When this is done one suffers the humiliation of having the bank refuse to honor the check, and the person infringing is open to the criticism of being unbusiness-like at least, and there is usually a small extra charge to pay.

Countermanding

Should one desire to countermand the order of payment on a check after it is issued the payment can usually be prevented by notifying the bank in sufficient time.

Stubs

Stubs are the inner margin of a check book, from which the checks are detached as used. Upon either these or the inserted pages of the pocket check book data should be recorded concerning the check which is detached. Space is given for noting the data, number of the check, amount, the name of the person to whom it is made payable and that for which it is given. These facts serve as guides in proving the vouchers when returned from the bank. Properly kept, the stubs indicate at a glance the amount still remaining in the bank.

From the preceding facts it will be seen that the bank may be made as valuable aid to the housewife in conducting her business as for anyone else who has exchanges to effect. By means of checks money may

NO. 32	PAY TO	Gas Light Co	6	20
DATE	March 2 nd	1905	FOR	Fuel \$20.75 + 2.00
NO. 33	PAY TO	Mrs. L. Hutchins	10	90
DATE	3 rd	1905	FOR	Meat
NO. 34	PAY TO	Jones & Stratton	12	49
DATE	March 3 rd	1905	FOR	Groceries
NO. 35	PAY TO	Cash	5	00
DATE	March 6 th	1905	FOR	Wound
TOTAL,			33	59

be more easily and safely transferred than in any other way, since they can be enclosed in letters, if necessary, and they avoid the danger of mistakes in "making change," or of loss of money. Since they may be made payable to a stated person only, if lost they are of little value to the finder. Even if lost after indorse-

ment, the payment may be withheld by notifying the bank.

Vouchers
as
Receipts

A check eventually becomes all the receipt necessary in paying bills, thus saving any further trouble of receipted bills. If checks are used entirely in payments, the vouchers constitute a comparatively complete household account in themselves, but this is rarely feasible, as employees find checks an inconvenient form of payment, since they are often not identified so that they can get them cashed; besides, checks are quite unknown to them, so that they are slow in appreciating them as money equivalent, and their hours are such as not to conform well with banking hours.

The pass book is important as a record of the depositor's standing at the bank. That this record may be kept accurately, it is necessary to present the book with each deposit. The depositor is never at liberty to make entries in it herself; that can only be done by the receiving teller. The pass book should be presented when called for and should be balanced as often as once a month if a considerable business is done through the bank; even if the pass book is lost, the money may still be drawn out at will.


Comparing
Vouchers
with Stubs

Returned vouchers should always be compared carefully with their stubs. Should there be any discrepancy between the balance as given by the bank and that shown in the check book, one should determine whether this corresponds exactly with the amounts of any checks issued, but not returned.

Neither check nor pass book need affect in any way the household account book, except as they are made to be valuable aids. They form a very convenient department of the cash drawer, the cash in hand and cash balance in the bank together making up the sum total on hand.

In some cases if a bank account is properly kept it may serve as a fairly complete system of book-

Bank
Account
Book-
keeping

No. 65 March 10 1905 to Am Sch of Household Econ for tuition Balance from \$ 125.66 Deposited \$ Total \$ This check \$ 15.00 Balance \$ 110.66	 Chicago March 12 th 1905 No. 65 First Dearborn National Bank 200 N. MONROE & CLARK STS. PAY TO THE ORDER OF <u>Am School of Household Economics</u> \$ <u>15.00</u> <u>Fifteen and no/100</u> Dollars <u>Harriet B. Couch</u>
--	--

A CHECK WITH STUB ATTACHED.

keeping in itself. In such a system it is necessary to deposit *all* money received, making careful record on the blank sheets of the check book of the date, amount, source, etc. Then all bills possible should be paid by check. The vouchers are a receipt in themselves. These returned checks, with the receipted bills, filed in an ordinary 25-cent bill file, give a safeguard against paying the same bill twice. All bills should, of course, be checked up before being paid. The stubs of the check book show for what the money was spent—so much for groceries, so much for the butcher, for gas, milk, rent, dress goods, etc. When cash is

necessary, as in paying employees or small incidentals, this can be drawn from the bank, or in some cases obtained from an obliging tradesman, who will exchange cash for checks. Memorandum should be made on the stub as to how the cash drawn is expended, or, much better, a petty cash account can be kept in a book or on cards. At stated periods a summary may be made from the stubs and from the receipted bills as to how the money has been expended.

Better
than
None

This system is not to be recommended for those who should look after the pennies carefully. The incidentals will be found to foot up to a surprising amount and it is always better to pay cash for groceries, meat, etc. However, such a system is better than none, and as it is practically automatic, it can be followed throughout the year with very little effort. The poorest system, kept accurately from year to year, is better than the most perfect system kept only intermittently.

Financially
Organized
Family

In a family which is properly organized financially there is a definite idea as to how the income shall be divided. A certain proportion is allowed for rent, food, saving, etc., as already indicated. Then each member of the family should have a personal allowance, to include definite expenses, of which a personal account is kept. As soon as a child is old enough to trust with 5 or 10 cents of its own he should be given such allowance regularly and taught how to spend as well as to keep account of expenditure. Only by experience can one learn how to spend wisely.

TEST QUESTIONS

HOUSEHOLD MANAGEMENT

PART I

Read Carefully. Place your name and address on the first sheet of the test. Use a light grade of paper and write on one side of the sheet only. Leave space between answers. Read the lesson paper a number of times before answering the questions. *Answer fully.*

1. What do you understand by the terms *production* and *consumption* in economics?
2. Compare their relative importance in Home Economics at the present time.
3. What is true economy?
4. What do you consider valid reasons for maintaining individual homes?
5. (a) What do you understand by the term Standard of Life?
(b) How are you conscious of such a guide in your own life? Have you been conscious of your standard changing from time to time?
6. What value do you see in a Division of Income along some such lines as are indicated in the text?
7. Comment upon the examples of both Typical and Ideal Budgets in the light of your own experience.

HOUSEHOLD MANAGEMENT

8. What do you consider a desirable division of a salary of \$1,500 a year, the family, occupation and location to be chosen as you please? Indicate clearly and fully both conditions and divisions.
9. Estimate as nearly as possible the division of the income in your own household and criticise.
10. Why are household accounts essential?
11. How many housekeepers of your acquaintance keep careful household accounts? Do you discover any indications of greater success because of it when compared with those who do not?
12. What system of account keeping do you find most usable? Give details.
13. Explain "Balancing an Account."
14. What is meant by "Indorsing a check?" Illustrate and explain value.
15. (a) What are stubs? How valuable? (b) What are vouchers?
16. In what lines of expenditure does there seem to be especial lack of thrift at the present time? Suggest causes and corrections.
17. What do you consider the chief cause of the increased distaste for housekeeping among women and of the tendency to give up individual homes in favor of apartments? How do you regard the change?

HOUSEHOLD MANAGEMENT

18. To what extent have any subjects which you studied during your school life been directly and practically helpful to you in your home-making experience?
19. Is there any additional training or subject which it seems to you might be profitably added to the curricula of our schools or colleges for young women?
20. Have you gained any new or helpful suggestions for the more successful management of your home as a result of this study? If so, what?
21. What additional suggestions can you make on any of the topics taken up in this paper as a result of your experience or study?
22. Ask two or more questions on the subjects considered in this lesson.

Note. After completing the test sign your full name.

Household Management

PART II

LESSON PAPER

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AMERICAN SCHOOL OF HOUSEHOLD ECONOMICS

HOUSEHOLD MANAGEMENT

PART II

ORGANIZATION AND DIVISION OF LABOR

Few things in life are more pathetic than a household in which no organization exists, no systematic direction of activities, no appreciation of Heaven's first law, order. The haphazard, aimless living in such homes leaves an unmistakable stamp upon the inmates. Without knowing it, the housewife in such a home suffers infinitely more friction, loss of time, strength and money than it would cost her to keep her house-keeping better in hand.

Order

To have sufficient system and organization so that one knows (1) what is to be done, (2) who is to do it, and (3) when is it to be done, is to have the chief requisites for the successful working out of ideals, coupled with ease and comfort of mind. Applying this knowledge each day, one may utilize whatever time is at her disposal for other enjoyments, conscious that she is not thereby neglecting what should ever constitute her first duty—the care of her home and family. It makes little difference whether it be the mother of several boys with limited means at her command or the woman who can afford to hire several helpers; there is keen pleasure and satisfaction for

What
Who
When

all in work so carefully divided that each has the gratification of knowing the importance of his portion and feels a commendable pride in his own contribution toward the whole. This gratification may be made as real for the helpers as for the one for whom the work is performed. The joy of definite duties carefully related to the whole, in contrast with the lifeless routine of ill-defined, meaningless details, appeals to the one as truly as to the other.

Requisites

Each thoughtful housekeeper finds her own best methods of accomplishing this organization. Some general suggestions as to necessary equipments may be an aid. Certain things are absolutely essential for success, such as the following:

Brain Power

Brain Power with *Mental Alertness* and *Activity*. Method is impossible to one unwilling to contribute these.

Knowledge

A *Knowledge* as to how to perform the details of housework in a superior manner. Unless one understands what is necessary in the preparation of a certain dish, or the length of time it ought to require to clean a room properly, it is quite impossible to direct it so that the requisite amount of time and strength shall be expended upon it, and no more.

Health

Health plays no small part. Much failure has poor physical conditions at the foundation. No truer criticism has been made of American women in general than that of a leader in the study of home problems, when she affirms that too many are content to be

"just able to be about." Home is the place where suffering resulting from this low standard is certain to be most keenly felt. Without excellent physical vitality, the cares of a house must, perforce, seem mountain-high. The exuberance of spirits of one full of life and energy is transmitted like an electric current to all who come in contact with it, and inspiration, each for his task, is the inevitable result. Very unfortunately, the reverse is equally true. Failure to possess the cheerfulness and optimism born of perfect health creates conditions well suited to spread a contagion of a very depressing nature. Inability on the part of a leader to do his share is soon followed by a lessening of interest on the part of the helpers. A dropping off of punctual and hearty performance of duties results.

Self-control is another necessity. Ability to think coolly and calmly, even under pressure, and to plan carefully and intelligently at all times, goes a long way in directing others. This characteristic is too often thought to be entirely a matter of temperament, beyond individual control. It is a great mistake. Individuals do differ in a marked degree, it is true, in the natural possession of it; nevertheless with good normal conditions of health, especially of "nerves," that bane of woman's existence, this virtue is as possible of attainment as any other and well worth a struggle to secure.

Self-Control

A large *Sympathy*, which appreciates the difficulties

Sympathy

encountered in doing the work, proves a priceless aid to the successful superintendent.

Forethought

Forethought is an important requisite. One must have in mind a broad survey of the work to be accomplished. The outline of at least a week at a time should be clearly defined to oneself, each day being assigned its special work in addition to a regular routine preserved from week to week. In this scheme all work such as washing, ironing, sweeping, cleaning and the like will find a place, if these are all done in the home. The routine should not be infringed upon,

Routine

unless extraordinary emergencies arise. A system broken is hard to restore, and something is sure to be crowded out, if postponed. Each day's work should be so planned that the menu will be given to the cook, if one is employed, at least the day before, and marketing will be attended to, so as to secure early and prompt delivery next morning. A careful mental, or better, *written* note should be made of all details liable to escape notice at the proper time. This avoids a confusion in the morning of being needed in several places at once, while the machinery will not be at a standstill, waiting to be set in motion again. It avoids waste of time at a very valuable part of the day. The early hours count for much in starting the work so that tiring haste and over-pressure may be prevented later. If helpers know, when they arise, what the day's work is to include, they can plan to far greater advantage, saving time and strength. Written orders are a great help here.

**Written
Notes**

Adaptability of means to ends is a thing that the would-be organizer may well study in successful business men. A business man's office is so arranged that it is to the highest degree labor and time-saving. It is compact, orderly, simple, with nothing unnecessary filling space. Every thing is at hand and adapted to make his work swift and easy. The successful workman's tools are good in quality, in perfect order, and so arranged that every motion counts. He knows that it is economy to have them so. How many of our kitchens would stand the test satisfactorily in these particulars? Most kitchens, pantries and laundries are so arranged that there is a prodigal waste of time and strength in passing from one thing to another. One should see to it that the cooking table is not on the side of the kitchen opposite the pantry of supplies or cooking utensils, and both as far as possible from the stove. A little trouble and perhaps no expense will often better conditions.

Adaptability

It would seem far more ideal a condition than has yet been reached were it possible to give certain fixed standards for the division of the work of a house so that helpers going from one to another would find practically the same duties expected of them. To attempt such outline, would be too hazardous to undertake. Were housewives who employ, asked to define the duties of "second girl," "nursery maid," or even of laundress or cook, hardly two would be found to agree, so individual has been the assignment according to the particular needs of each household. One ex-

*Division
of Labor*

pects assistance in one line of work, another in another. In one house the housewife rarely appears, gives no assistance and maintains the most formal relations with those employed. In another she prefers to direct minutely and to assist in the performance of portions of the work, attempting at the same time to make her helpers feel a home-like enjoyment of what she is able to provide them. Such diversity renders it impossible to arrive at any general plan or division for each helper which shall be adapted to meet the needs of all who employ.

Diversity of
Requirement

Even in homes where several are employed something of the same irregularity is found. A "second girl" at one place is expected to look after the door-bell, wait on table and do nursery work. Perhaps with her first change of place she is asked to assist the cook by preparing vegetables and does laundry work.

Study
the Only
Solution

The best guide at present is a patient, thoughtful study of the problems of one's own house until as equitable and consistent division is attained as can be made, meanwhile praying for speedy release from a condition so unsystematic and chaotic as that of the present time, and resolutely setting one's face toward the ultimate solution of some, at least, of the difficulties through better adaptation of household management to the demands of the age.

The Right
to Servants

A woman has no right to a servant until she knows the value of time and strength in relation to the work to be done. She cannot understand her servant's problems until she understands a servant's duties.

DOMESTIC SERVICE

Even the most fortunate housekeeper recognizes in the present situation of domestic service a state of affairs sadly chaotic, perplexing and deplorable. Merely to cry out against it is futile and would be but adding to an already long list of complaints. The following pages are intended rather as an indicator of some indisputable facts, to be recognized and dealt with by would-be successful employers.

Chaotic
Conditions

Domestic service in the United States has passed through great changes in the last fifty years. Conditions, in some respects, were never like those in any other country. Until within a few years in New England and the Northwest whatever assistance was needed in performing the work of the household beyond that rendered by the members of the family was secured by employing a neighbor's wife or daughter, who shared in all particulars the interests and privileges of the family in which she was employed. She was recognized in every way as an equal, sitting at the family table, sharing the common sitting room, often marrying into the family. While this continues to be true to a slight extent in rural districts to-day, there has been, generally speaking, an entire change, the present being a period of transition and reconstruction. The two factors which have had the greatest influence upon the domestic situation are immigration and the changes in the industrial system.

Changes

**Influence of
Immigration**

The influence of immigration upon domestic service has been more or less similar to its influence upon occupations for men. As the unskilled labor of the ignorant immigrant has entered into competition with the labor of the more skilled and intelligent native workers the native employes have progressed, pushing up and out into lines of work which have been deemed higher, more lucrative, pleasanter. This has happened in domestic service until very few native Americans can be secured for housework at the present time.

**Rural
Supply**

Rural districts have suffered a surprising falling off in supply due to this change, as the immigrants tend to congregate in the large cities, especially those who come to us from the countries of the principal supply of domestics—Ireland, Germany, Sweden, Canada and Newfoundland—and the country girl has learned to seek the city also.

**Industrial
Changes**

Manufacturing industries have a large influence in determining the number of women engaged in domestic service in any city or community, as they seem to prove more attractive than housework at the present time. Whenever there is competition with other kinds of employment housework is inevitably the lesser attraction. It is done, if at all, only when there is no other alternative; a last resort rather than a choice. It is not surprising, in the light of these facts, that the kind of service rendered by those who are engaged in it is not as satisfactory as it should be and that the standards in the service are very low, with little apparent

spirit of emulation or progress. Let us consider the leading elements in the problem from the point of view of both employer and employee, seeking to ascertain the real and alleged causes of this marked preference on the part of employees, and if there are any remedies which may be applied to the immediate relief of the situation.

If we turn to consider, first, the advantages of domestic service over other forms of labor open to women of the class thus employed, there are several decidedly advantageous conditions peculiar to the work. The conditions for preserving good health are superior to those in almost any other occupation. The work is normal, with greater variety, better provision of light and pure air and more consideration in case of temporary illness. Steady employment is afforded in work for the most part congenial to those who have any understanding of it. In spite of much said to the contrary concerning irregularity of hours, there is less rigid confinement than in most occupations.

Advantages
of Domestic
Service

It affords more home life than other kinds of work, although this is in the home of the employer and is not considered as home life by the employee. The degree in which the employee is allowed or made to feel this differs greatly, as all know, with employers and, to a certain extent, the number of employees. That there is far less difficulty where there are many employees is shown in the fact that the majority of state institutions have no difficulty in obtaining help of all

Home
Life

kinds. Even insane asylums, where the work is very hard, can actually make a choice of applicants for housework instead of having to seek for them. Even under the worst circumstances a certain sense of protection and comfort is offered in connection with the work, and at its best the comforts and positive luxuries which surround the maids far exceeds those they could have in their own homes.

Disadvan-
tages

In spite of these important advantages, the work is most universally unpopular. All are familiar with the reasons offered for this. Irregularity of hours is a point frequently urged. It is true that the hours of labor are so loosely defined in most households that employees have little sense of having completed the work of the day. This is true to some extent in well-regulated households on account of the nature of the work. Lack of system and care in this respect too often unduly increases the irregularity and makes what might be a reasonable amount of work unreasonably heavy.

Loneliness

It is also true that the employee, although nominally in the family, is in no sense a part of it. This is a position infinitely lonelier than to be outside it altogether. Very few employees feel free to receive or entertain personal friends in a manner natural or pleasant to them, nor are they expected to do so. Attempts to secure personal improvement or pleasure are perhaps ridiculed. This is probably not intentional on the part of the employer, but seems to be the

result of failure to appreciate the needs of the employees or to provide suitably for meeting them.

Opportunities for promotion and advancement, which play a very important part in stimulating to effort in other employments, are almost wholly lacking in the present methods of conducting domestic service. The most that can be hoped for through a change is an easier place, a slight increase in wages, a pleasanter employer or some trivial gain. The work is so ungraded that the unskilled, inefficient worker receives practically the same wages as the skilled and capable.

Promotion

Disparity in wages is sometimes offered as a reason for the choice of other work, but this is readily proved to be invalid. A comparison with the pay in any other form of employment would be favorable for the wages of the domestic employee at the present time. Wages differ greatly in different sections, yet they bear sufficiently close relation to other expenses so that general comparisons may be made. Miss Salmon in her admirable work on Domestic Service makes the comparison between the average wages received by the domestic employee and the school teacher. In this she clearly shows that, considering the fewer demands made upon the domestic employee in maintaining her position in contrast with those made upon a teacher, and also the many aids and comforts which are not easily measured in full money values, such as board, lodging, laundry and the like, the average wages of the domestic employee is higher by a generous margin.

Wages

The average salary of women teachers is \$545 a year; \$260 must be deducted for board and lodging and \$25 for laundry. There is left \$260 with which she must meet such necessary expenses as clothing, traveling, social obligations and working capital, as books, etc. If one considers in addition, as is certainly legitimate, the necessary outlay for training in the one case, in contrast with the low requirements in the other, it becomes very apparent that one must look elsewhere for an explanation of the great popularity of the one form of service and the unpopularity of the other.

**Social
Stigma**

There remains a final objection, which is in reality first in importance and which has more to do with keeping desirable helpers from choosing this kind of employment than any other. It is the reason invariably given first by those who express their feeling frankly and unreservedly. This is the social disadvantage experienced by those who engage in such service. This stigma is subtle, but very real in its resultant evils. It takes its rise in the false attitude of many employers toward housework, and the utterly false idea of what equality in this free American country really means by those whose limitations of ignorance or opportunity have led them to take a wrong view of the entire matter.

**Employer's
Standpoint**

When we turn to the employer's point of view there is much to be said considering the unsatisfactory situation. Taking the present-day employee into the home is attempting to introduce into the life there one who is of different nationality and who has little in common

with the other members of the family from any point of view. Inheritance, former environment and experiences could hardly be more unlike in the majority of cases. There can be little expectation of accomplishing or even approximating perfect assimilation.

As there is no opportunity, in the majority of households, to rise in this employment, the desire for change or betterment finds lively expression and diversion through new places. As a result the employer is put to her wit's end to cope with this tendency, and is often exasperated, and rightly, by her neighbor, who resorts to illegitimate means of influence by overpaying, and who ignores the fact that she is thereby only multiplying the difficulties. Much selfishness is revealed in the methods employed by harassed employers, who are often placed in so hard a position that it becomes a supreme test of character to decide what to do to secure and keep the needed help. The majority of employees are astonishingly oblivious to real present opportunities, so eagerly do they grasp after vague advantages through change. As a result, the average length of service in one place is less than one and a half years in cities, and in towns where the desire to go to the cities is strong it is still shorter.

The ignorance of the average employee of the present time is profound and very exasperating, the more difficult to cope with because of the assumed intelligence in most cases. The perplexities and trials of being forced to employ untrained helpers for work

Irresponsi-
bility

Ignorance

which requires skilled labor can hardly be exaggerated. That more of this crudeness is to be found in this line of work than in any other is indisputable. It is accounted for partly in the present failure to show appreciation of good work or to properly reward it. This is one of the greatest menaces to satisfactory service.

Summary

These, then, are the objections to household service: It provides no real social life; it takes the worker from her own home and places her where, however comfortable she may be, she is an alien, often losing caste among her friends, hence having no social place; it offers no incentive to rise, no spur to ambition, except that of personal pride or desire to please, and this, if not lacking in the first place, may cease, because there is no real competition.

Also, it should be stated that all places are not comfortable; a cold, cheerless, illy furnished room cannot seem a rest or refuge after a hard day's work. Work over a hot stove, however neatly done, certainly does seem to demand for the person engaged in it proper hot water bathing facilities.

**Time
Off**

Fresh air is an essential to happy, healthy living. One afternoon weekly cannot enable the maid to store away sufficient fresh air to keep her through the following six days.

Simply from the selfish standpoint, that of getting the best work from the machine, reasonable forethought should be given, not only for the comfort, but

for the personal freedom of the employee. This means that if the best work is expected from the worker an endeavor should be made to keep her in the best physical condition for that work. When the prescribed work is finished it is normal for anyone to desire to get out and away from the place in which she has been working. If a maid's sitting room were or could be a part of every house there would not be the temptation to seek the street or a friend's kitchen for rest and recreation. This sitting room is often an entire impossibility; it is frequently considered in that light because it entails a sacrifice of space or some expense. There is far too frequently an utter disregard of the actual condition of what may be termed the rolling stock of this business. It is economy to keep the machine well oiled, well repaired and well housed.

Pleasant surroundings do much to lighten labor and make it attractive, whatever kind of work it may be. This fact large manufacturers and merchants have recognized and utilized to their great advantage. The housekeeper may learn the same lesson, and a maids' sitting room may become the rule rather than the exception.

Pleasant
Surroundings

Reasonable forethought entails a recognition of the fact that as there are now few standards of work or methods of doing it, so that the new cook or maid, no matter how well recommended or even equipped, has no idea of how you desire your work done or how you wish it systematized. Proper and sufficient directions

Standards
of Work

Written
Directions

should be given and proper care that they should not be presented in a confused manner all at once. Perhaps they can be given best in writing, a type-written sheet placed in the kitchen or some suitable place and used for reference. To this can be attached the special direction for the following day each night or afternoon, and the chances are this plan will aid very materially in the smooth running of the machinery of the household. Such a plan need not be in too great detail, unless the maid be very untrained.

Daily
Outlines

Miss Parloa suggests such a daily outline in her work on *Home Economics*, as follows:

1. Make the fires, air the dining room and hall.
2. Prepare the breakfast and set the table.
3. Put the bedrooms to air while the family is at breakfast.
4. Remove the breakfast dishes; put away the food. Sort the dishes and put to soak all dishes and utensils that have had food in them which is liable to stick.
5. Put dining room and sitting room in order, airing them well.
6. Wash dishes, put kitchen and pantries in order. Prepare dishes that require slow cooking and put them to cook.
7. Make beds and put sleeping rooms and bathroom in order.
8. Trim lamps.
9. Dust halls and stairs; sweep piazzas.

This plan is for a maid of all work, and naturally would be varied in many households, but indicates the

idea. The more definite the work can be made, the better.

Personal freedom for the maid means about what it does for the mistress; freedom to choose and have her own friends, to have them call and visit with her; to receive them without unnecessary and seemingly impertinent interruption or surveillance; freedom to come and go within reasonable limits without asking permission or giving explanation each time. In short, it is an application of the Golden Rule, and means such treatment as will insure the respect, if not the liking, of employee for the employer. This may seem revolutionary, actually impossible to many, and probably is where there is a succession of unknown, untried, unreferenced maids passing through the kitchen every four to six weeks. This plan, however, has been tried with success in many places.

Personal
Freedom

In a small city in Northern New York, where the majority of people are in the maelstrom of the domestic situation, there is a family that secures help readily and whose maids remain with them until a proper reason, such as marrying, causes a change. The employer in this case considers that she employs the maids to do the work, not simply to be in the house. When the work is finished the maids are at liberty. If two are in the house, one is expected to be ready to answer the bell; if one only is employed, there never has been trouble or even necessity of making any rule about this mooted point. This housekeeper has argued that

A Case
in Point

in general she would prefer to answer her own door bell and have the real work cheerfully, faithfully and well done, and that to get out of doors undoubtedly would be better for maid and work than staying in would be. This mistress has provided her maids with suitable reading matter for their leisure time, and shows that she is interested in the outside life of the girls without unduly interfering with it. In consequence she has good service, the maids are well and happy, and so is she, for friction is almost unknown in the running machinery of that home. Perhaps this should be noted, that in general the mistress does not have to answer the door bell, and many little thoughtful services are performed for her not nominated in the bond.

Reorganiza-
tion of the
Home

The real question is not the reason for the dearth of good household workers, but what suggestions may be made to assist the housewife in this trying situation.

In its ultimate effects the domestic situation of to-day will probably bring about a reorganization of the home. This is to be hoped and desired, if that reorganization means raising the work of the home to its proper position as a recognized business affair, whose director is required to have a knowledge and skill somewhat commensurate with the issues at stake, the interests involved. It is absolutely necessary that the director of the home should know and be trained for her business if she is to demand and obtain skill and training in those she directs. The recognition of this need is the first great step toward reform.

The second is the acknowledgment of the fact that in general the housekeeping of to-day is run on an antiquated plan, one not even fulfilling the needs of an earlier generation and entirely inadequate to cope with the tendencies of to-day. The plan has to be changed. No progress will be made if women spend their time in bemoaning the present condition only; we must put our wits to work to better it.

These, then, are suggestions: First, that there should be more universal effort made, particularly in communities where clubs discuss these things, to secure certain just standards of work to be done for a certain just wage. The work of each household should not vary between unknown limits and the wages still be the same in each.

Suggestions

Co-operation in establishing standards of work is much needed. Why should the cook who prepares three elaborate meals daily for a family of six adults, who often entertain, be paid the same wages as the cook next door, who prepares simple meals for three people who live most quietly and rarely have a guest? Workers in factories and stores at least are governed by the same number of hours. Just as the life, numbers and demands of different families vary, so does the work vary. A standard of wage cannot be established without a corresponding standard of work.

**Establish
Standards**

Secondly, that housekeepers should bring themselves to a willingness to adopt the hour plan, the worker coming in, and work being done and paid for by the

**Work by
the Hour**

hour according to kind or skill involved in accomplishing it.

The immediate objections to this plan are, first, its expense, and then the seeming strain upon the housekeeper, who must either piece out or piece together this patchwork scheme. Then arises the question: "Where shall we get the workers?" for in many places this is a problem.

Expense
of the
Hour
Plan

As to expense, in only a few cases has it been compared, hence there is a lack of sufficient data. In general it may be computed in this way: Take first into account the wages of the maid or maids, add board and what may be called room rent, including light, etc., used. One family living in the West has carefully kept account of the expenses with and without a maid and have concluded that in general a maid of all work costs \$5 a week above her wages. This is higher than Mrs. Abel's estimates, which were based on the actual experience of a family of seven.

An
Actual
Experience

The family lived in a small town in New York, and consisted of five men and boys and two women. These estimates are the comparison of two successive summers. In both cases the laundry was done outside, hence has no place in the comparison.

• *First Summer.*

Wages of maid per week.....	\$3.00
Board per week.....	2.50
Rent of bedroom.....	.50
	<hr/>
	\$6.00

The exact amount of room rent could be known, as the house was too small for the maid and a room was rented outside for her.

Second Summer.

(Work done by the hour.)

Dishwashing, two and a half hours for six days (fifteen hours).....	\$1.50
Cleaning (15 hours).....	1.50
Dinner service, three hours for six days (eighteen hours).....	1.80
Sunday dinners at hotel, seven, at 25 cents (less estimated cost of food material).....	.88
	<hr/>
	\$5.68

From these and other data it might be determined that in general a maid costs her wages; that is, if paid \$5.00 a week, the conditions are such that the probable cost for her board and lodging is \$5.00 also; if paid \$3.00, it cost another like amount for her "keep."

In Chicago so many of the very good apartment houses are constructed without accommodation for maids that the hour plan is popular. The general consensus of opinion is that the hour plan is less, not more, expensive, and has advantages not reckoned in dollars and cents. By those who have tried it the advantages of the hour system are stated to be that the work is in general better and more rapidly done; there is not such waste of material, and that the freedom from the responsibility and presence of an actual

In
Apartments

alien in the house, especially in an apartment, is incalculable.

**Where to
Obtain
Workers**

The question of where to get these workers remains to be solved. That is a very individual one, belonging to the conditions of each city or town. As club women take this up, bureaus such as the Household Aids Company of Boston will be established, and even now from guilds and industrial unions, often from bureaus of charity, such workers are easily obtainable.

One young woman in Brooklyn, after desperate times with incompetent help, advertised for a married woman with children who could leave her home for a certain number of hours a day. She obtained a refined woman in reduced circumstances, untrained for any definite work, whose experience made her of the greatest assistance. She goes to the house for a stated number of hours each day to care for the babies, while the mother performs her social duties. This mother does her own cooking, having the dishwashing done by the hour. The expense is lessened, her home is charming, she feels she is leaving the children in safe, "grammatical," understanding hands, and she has leisure for profit and pleasure, for the higher life, which she says she never had in the old plan, even with a smaller family.

**Natural
Progress**

We must realize that natural, industrial progress has taken one by one from the home the occupations formerly carried on there, until housekeeping no longer means the making of many things, but the proper expending of money for things already made.

We should not resist this tendency, but recognize and fit into it.

It must be remembered that the sanctity of the home is not preserved by the industries carried on there. To preserve one home at the expense of several others is neither economic nor ethical. When clubwomen talk about the sanctity of the home they should ask the question, "Whose home?"

Sanctity
of the
Home

Mrs. Mary Hinman Abel, who is a close student and a wise observer of economic conditions as they affect the home, says that the solution of present troubles must come in part from reducing the kinds of work done in the home. This is along the line of industrial progress as well as that of the least resistance in this case.

The laundry is disappearing from the house, following soap and candle making. True, there are many more poor laundries than good ones, but that there are good ones, and that these have been run with a profit, proves there can and should be more.

The establishment of laundries is one step, and a perfectly possible one. A well-educated Southern woman, after taking a course in household science at a Northern institution, started a laundry in a Northern city. The work was entirely done by hand and a fair price charged for it. She supervised the work and employed competent people to do it. It paid well in every sense for both owner and patrons. When circumstances forced her to lay aside the work her customers were as homeless people; they had no other

Establishment
of Laundries

place to go. What one woman has done other women can do, and it should be emphasized that this woman was well born, delicately brought up, educated and a Southerner, with the inevitable shrinking from labor outside that such a bringing up entails. She says that her patrons became her friends, that work she took up with shrinking became really delightful, simply because it was well done.

Good
Employment
Agencies

Another step is the establishment of more properly run employment agencies. Too many cases are known of employment agencies that encourage their maids to change often, to the end that they may gain additional fees. Employment agencies where references are required and looked up, where the maid is actually investigated and known as well as the housekeeper, where honesty is considered not only the best but the only policy are not castles in Spain. They can be established, supported and run by women and women's clubs.

The
Future

Whatever solution the future may hold, employers are beginning to realize that it is not through greater individual indulgences, more equality or higher wages that the problems are to be solved. Employees do not ask to be admitted to the family circle. Self-respecting helpers would not feel comfortable were this provision made, nor is it a practical way of removing the difficulty. What they desire as a class is, rather, the opportunity of independence which other forms of employment afford and which is missed in this—a chance to perform their work and, apart from

that, to live their own lives in their own way.

However desirable any opening or advantage, the spirit of liberty demands that it be *chosen* rather than forced upon one. What domestic service is really claiming for itself is some adjustment whereby definite hours shall be secured, and, outside that, free choice of amusement, personal improvement, friendships—*life*.

Definite
Hours

This, when secured, will prove one of the most reasonable and satisfactory aids to the solution of difficulties of both employers and employees. The final adjustment to the same basis as all other industrial and business activities will be a work of time, no doubt, but it seems to be the inevitable goal.

Industrial
Basis

As employers and the world at large gain and keep in mind a truer conception of the importance of household employment in the economic world there will follow better practical results. As long as employers express scorn of these duties little can be hoped for in the way of "dignifying labor" in the home. The efficiency of the housework cannot be expected to rise above that of the mistress as manager. There is deep significance in the words of one who wrote: "To know the workman one must have been a workman himself, and, above all, *remember it*." The housekeeper must know the household affairs and *respect* them if she would have others do the same.

Dignity
of Labor

There are some experiments being carried on at the present time that all should follow with interest. These go far to prove that the preceding statements are not without foundation. Notable among these is

Household
Aid
Society

the attempt which has been made in Boston to create an attractive home center for helpers, from which they go each day for a definite number of hours for employment in various homes which desire their services. The helpers are classified and graded, as already suggested, according to efficiency, the wages paid corresponding to the degree of skill attained. There is adequate stimulus to advancement, as instruction is given at the home center. The home life is natural and congenial, every attempt being made to enhance the wholesome pleasure to be derived from such a place. The rapidly increasing popularity of the experiment shows that no mistake has been made in the diagnosis of the employee's point of view. For the employer there is the difficulty of arranging the work to fit such a plan so that the desirable work shall be secured at a price not exceeding the expense of resident help. This is a difficult thing to do, a thing not yet accomplished, but which the ingenuity of woman will yet solve. Without doubt it will mean the simplifying of life in some homes, but if this is wisely arranged it will be a gain rather than a loss.

BUYING SUPPLIES

Women, as a usual thing, spend such small sums of money at a time in their purchases for the house, that they are apt to lose sight of the size of the total amount expended in a year. Not realizing the value of the aggregate it follows that they hesitate and study returns far more carefully and intelligently in investing one hundred dollars in any other way than in placing the same amount in household supplies. Those who realize the importance of economic buying follow current prices and buy when the market offers the best inducements. The difference in time expended in exercising this care is not as great as is fancied. Watchfulness and interest count chiefly. There are times of legitimate annual or clearance sales when real bargains may be secured. These should be watched for and taken advantage of in buying yearly supplies of things which may be safely stored. If the articles to be purchased are such as suffer from the competition of "style" one is especially enabled, with a slight sacrifice of style to quality, to reap a rich harvest at the expense of the foolish of the world who must have the very latest fad at whatever cost. The extremes of fashion are folly economically, in that they make it impossible to realize nearly the value of money expended.

There is only a small range of supplies in which there is a marked style. Individual preference controls

Relative
Importance

Legitimate
Bargains

Buying in
Quantity

in the selection of most, so that when one has determined upon the most desirable brand, variety, etc., there are left but three things which must be weighed in deciding the amount to be bought. These are (1) room for storage, (2) ready money for the purchase, and (3) the perishable nature of the article. The economy of buying in quantity must, necessarily, depend to a large extent upon these points. When these can be satisfactorily met there is great advantage in buying in quantity. Thereby one has the advantage of wholesale prices or great reduction over retail prices on quantities not too large for a moderate-sized family to dispose of within desirable limits of time.

**Small
Quantities**

The family that finds it necessary to buy its supply of coal by the fraction of a ton and flour by the pound, suffers great loss through the increased expense, paying often very nearly twice as much as the same grade would cost in larger quantity, and with no gain since these products gain in value rather than lose, by storage. Buying in small quantities at retail means paying a generous profit for grocer or messenger boy's wages in delivering the small amounts. Again, one suffers from having to look her supplies over frequently or has the annoyance of finding something missing when wanted.

Storage

The changed conditions of modern life from those of our grandmothers affect our habits in regard to storing supplies. Now that a large number of homes are rented, each room counting and swelling the

monthly bill, it has naturally led to economy of space. The uncertainty of residence with some has its effect also, as the expense of moving is increased by quantity, and the danger of injury and breakage all have to be reckoned with. One great misfortune which results from these considerations is the inclination to turn to cheap grades which are more readily disposed of at such a time or cause less regret if injured. Thereby we are losing some of the refining influences of acquiring and possessing the best. This applies especially to furniture and utensils, which ought to be bought as though they were to last a lifetime.

There is a happy medium between the huge chests of linen in former time which held supplies not used for years, yellowing with age, and the modern tendency of hand-to-mouth provision, satisfying only the weekly demand. There should be always a small emergency store of linen. Additions can be too easily made to require that it be very large. In fact, since it may be added to, usually, any day, the principal gain is realized by being able to buy better at certain seasons, as in January, than others, and the same reduction in price by buying in quantity may be realized in this as in groceries. Dish toweling by the roll at 13½ cents instead of 15 cents a yard, sheeting by the web or piece at a similar reduction, etc., are illustrations of the benefits to be derived through such methods of buying. An especial reason for buying table linens in January, in addition to any attractive

**Medium
Purchases**

prices which may be found at that time, is that the fresh supply of goods is in then and one may so secure a better selection. For storing linens a special chest or linen closet is very desirable and should be included in planning a house, but when not provided, an ordinary closet may be used, drawers, a trunk or a home-constructed box, any of which answers every purpose if well cared for.

**Storage
Requirements**

For storing groceries the requirements are a light, dry, cool room, as near the kitchen and pantries as possible. It should be supplied with lock and key, which the housekeeper or a trusted helper controls. Large quantities may so be put into it and smaller portions given out as needed for use. This is both an aid to economy (since the tendency is to use more liberally if there is a large amount at hand) and prevents such supplies as baking powder, tea, spices, etc., from losing in value through standing open. A year's supply is usually as large an amount as it is well to buy at a time. This is especially true of canned goods. These should be bought in the fall after the fresh supply is in market. By the dozen, or better yet, by the case of two dozen, canned goods may be secured at a reduction of from ten to twenty-five per cent. The same is true of the packages of cereals, although for small families cereals cannot be used rapidly enough to buy in large quantity. It will be found to be well worth while for those of limited space to attempt to make space somewhere for some storage room. With a large number of

families that are not cramped for room it should be a matter of more consideration to utilize a portion for this purpose.

It is only the very poor who have an excuse for being too limited in ready money for such advance purchasing. It is but thrifty to see to it that there is at least a small capital which may be used for such advantage. When once started it is a simple matter, since after that the woman of forethought will look ahead and plan so that the funds will be at hand as the supply-time comes around. Of course there is no economy in buying at a reduction a supply which is so rapidly perishable in nature as to cause a loss of enough to off-set, or more, the gain through getting in large amount. This is but a waste of time and energy as well as money. Vegetables are much cheaper by the bushel or barrel, and fruit, as oranges, by the box, but one must have a cold storage room to insure the safe keeping of either for any length of time. Even then there must be care in looking them over frequently to remove any that are decayed. For most families, therefore, it proves more satisfactory to buy perishable articles as needed.

A great difficulty confronts the would-be-wise buyer to-day in the fact that it is hard to establish standards of quality without some sad experience. When the housewife manufactured her own soap she knew beyond a question what constituted an excellent article. Through handling different kinds of cloth, in weaving

Ready
Money

Perishable
Supplies

Quality

or sewing, standards were created in that direction. Ignorance of real value makes the thriving "bargain counters" possible with their "remnants" cut from the webs on the shelves and offered at a price equal or even in excess of that for which the same goods may be bought by the yard elsewhere in the same store. Shrewd, not over-scrupulous merchants are bound to take advantage where it is possible, and the ignorant, unsuspecting purchaser pays a dear price for his or her ignorance.

Remnants

Utensils

In buying *utensils* the maxim, "The best is the cheapest," is an excellent one to bear in mind. One who makes a trial of different grades has ample opportunity to prove its truth. Cheap goods often increases the expense 100 per cent, while at no time does one secure anything of the satisfaction in use that is secured in the better class goods. Cheapness means, perforce, haste or flaw in manufacture. This results, naturally, in ill-shaped, defective ware. Durability seems to be a thing no longer estimated, so little does it enter into account in manufacture or purchase. Nowhere is the difference more marked than in kitchen utensils. Spoons with soldered or riveted handles, ready to part company with the bowls on the first real test of strength or heat, are poor economy. The same is true of the enamel ware which crackles and chips off with the first accidental heating or "sticking on" of food, after which it is unfit for use. So one might enumerate many illustrations of false economy of this

nature. It is the part of wisdom to pay a little more at the time and thus secure better wearing qualities and far greater satisfaction. The cheapest is rarely wise.

On the other hand, a medium-priced article in many things has real worth to recommend it to one practising close economy. In such purchases as bed or table linen and toweling, for example, the difference between a medium and high-priced grade may represent the difference between hand work and machine, between embroidered or hemstitched articles and plainer. Since this is not a question of durability, a purchaser has a legitimate right to weigh the differences in the light of her allowance and decide in favor of the plainer if it be wiser. It should, however, always be a decision based on an intelligent consideration of values. One should never be at a loss when detecting coarse, loosely woven and shoddy fabrics or other evidences of cheap work. Other differences she may be justified in weighing, never that.

One may purchase most supplies either in a department store or in one devoted to a single or limited line of goods. There is, on the whole, a difference to be found both in quality and price of the stock in the two places. The grade of goods in the specialty store is usually better and the price somewhat higher. The department store has gained great popularity because of the convenience of purchasing everything in one place and because of competition in prices

Medium
Priced
Articles

Department
and Specialty
Stores

which seem at sight to favor trading there. The careful buyer will frequently find the difference in price more than equalized in the quality of the purchase. This is especially noticeable in kitchen furnishings. The sharpness of the competition has tended to lower prices in the specialty store as far as the quality of the wares will allow.

Classes of
Supplies

Supplies, may be classed as (1) furnishings or utensils which are subjected to wear and consequently must be replenished from time to time, as furniture, bedding, carpets, kitchen, laundry and dining-room furnishings; (2) such supplies as are consumed in one way or another and so must be replenished, as fuel, food, soap and the like, and (3) such miscellaneous supplies as daily newspapers, magazines, plants, flowers, etc.

“Must Haves”
and “May Haves”

In buying these supplies one may divide them into essentials or “*must haves*” and accessories or “*may haves*.” The first division one must secure at once. It is well to leave the second list to be remodeled after one has lived in a house for a while.

It is surprising to one who has some experience like camp life to find how few the absolute essentials really are. Many accessories have come to be looked upon as “must haves” through long use. The evidence of some utility in everything, together with refinement of taste in every selection, are the great essentials in giving a home the subtle charm and comfort which we covet. Furnishings need not be many in number nor elaborate in quality to satisfy

these requirements. The greater the simplicity the more satisfactory, usually.

The following are lists of kitchen, laundry, dining-room and bed-room furnishings, with average prices. The amount of equipment required is determined by the size of the family and its demands. For two people of simple tastes the kitchen utensils may be quite limited and the dining-room furnishings few. The same things are required in bed-room fittings as for a large family, but not in such numbers.

Lists

KITCHEN UTENSILS

Range	\$30.00 and up
Coal hod .....	.75
Shovel, poker, lifter .....	.50
Towel rack .....	.25
Teakettle	1.25 up
3 Stew pans, 1 quart to 8 quarts .....	.75 to \$3.50
Frying pan .....	.60 up
Double boiler	1.50 "
Broilers, fish, meat and toaster .....	.90
Frying basket .....	.20 to .35
Muffin pan .....	.50 up
Colander .....	.10 "
Coffee pot	1.25 "
Tea pot .....	.75 "
Chopping knife and bowl .....	.75
Meat chopper	1.00 up
Strainers .....	.10 "
Bread pans, 2 or more .....	.50
Bread board .....	.50
Meat board .....	.50
Rolling pin .....	.25 to 1.00
Flour sieve .....	.10 " .25
Scoops for flour, sugar, meal, etc. ....	.10 " .50
Pans or basins, 2 or more .....	.30 up
Bowls, about five in assorted sizes .....	.75 "
Dish pans .....	.10 "
Drainer .....	.10 "
Dish cloths .....	.25
Floor and stove brushes	
Broom .....	.50
Dustpan .....	.25
Meat and bread knives .....	.75 up
Case knives and forks .....	.90
Vegetable knives .....	.20
Dripping pan	1.00
Egg beaters 2, Surprise and Dover .....	.50

KITCHEN UTENSILS (Continued)

Graters.....	35
Measuring cups.....	25
Lemon squeezer.....	10
Plates, granite.....	40
Skewers.....	25
Spoons.....	1.00 to 3.00
Bread box.....	.75 up
Hand basin for sink.....	.30
Funnel.....	10
Vegetable or pudding dishes, 2 or more.....	.50 up
Potato masher.....	.25 "
Garbage pail.....	.75 "
Refrigerator.....	15.00
Receptacles for flour, sugar, cereals, spices, condiments, molasses, etc.	
Chairs, stool, table.	

Prices

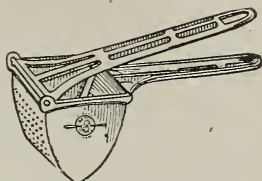
The utensils on above list may be considered "must haves." The prices of the various things vary within quite wide limits, as will be seen. The housekeeper should know enough of the materials composing utensils to guide her in the choice of material and price. This she cannot know without some knowledge of the action of the ordinary acids and alkalis used in cooking and cleaning operations on tin, iron, porcelain, agate, etc. To the list first given may be added many other things, many of which would be "must haves" in some kitchens.

Estimate

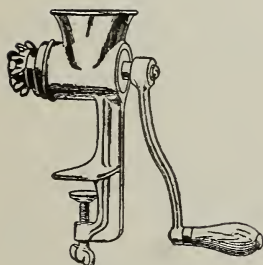
A fair estimate for fitting a kitchen with utensils given is from \$35.00 to \$40.00, including refrigerator, but not including range. \$100.00 is not too large a sum to apportion to proper kitchen fittings if the range be included, and it is desired to begin with enough good utensils to make the work easy.



Salt Box-



Potato and Vegetable Press



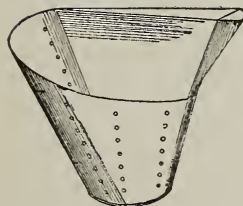
Meat Chopper



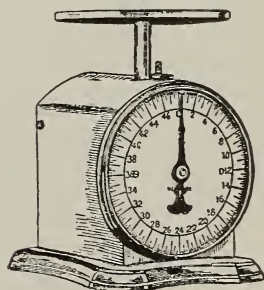
Soap Savers, to utilize scraps



Slaw Cutter, knife adjustable to cut fine or coarse.



Sink Strainer; keeps garbage from clogging sink and pipes.



Household Scales

SOME "MAY HAVES" IN KITCHEN UTENSILS.

LAUNDRY EQUIPMENT

Tubs, 1 or 2	\$3.00	
soapstone	7.00 or	\$8.00 each
Washboard .....	.25 to	.50
Wringer	2.75 "	4.50
Boiler	1.75 "	3.00
Pails, 2 or more, " Fibrota " .....	.50	
Baskets, 1 or 2	1.25 to	2.50
Dipper .....	.15	
Soap dishes .....	.15	
Clothes stick .....	.10	
Clothes line and reel for same .....	.50 to	1.10
Clothes pins, 1 gross .....	.25 up	
Skirt board	1.25 "	
Bosom " .....	.25	
Whisk .....	.10	
Sad-irons, 3 at least .....	.60	
Iron stand or asbestos mat .....	.15	
Holders .....	.20	
Clothes horse .....	.75	
Small vegetable or nail brush .....	.10	
Scrubbing brush .....	.15	
Ironing sheet .....	.30	
Blanket or felt	1.00 up	
Watering pot .....	.15 "	
Average Estimate	\$18.00	

ADDITIONAL UTENSILS FOR SEPARATE LAUNDRY

Stove	\$8.00 to	\$25.00
Coal hod .....	.25 "	.75
Shovel, poker lifter .....	.25	
Basins, 2 .....	.50	
Saucepan or kettle for starch .....	.50	
Strainer .....	.10	
Pans or tub for starch .....	.30	
Earthen bowls, 3 or more .....	.30	
Wooden or agate spoons, 2 .....	.30	
Table or laundry settle	2.00 to	6.75
Case knife .....	.15	
Broom or floor brush .....	.50 "	2.00
Small brush .....	.50	
Dustpan .....	.25	
Scrub brushes, 230	
Chair70	
Total Estimate, liberal	\$40.00	
" " fair	4.00 to	\$5.00

BUYING SUPPLIES

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LAUNDRY SUPPLIES

Soap, { soft, { hard, and { sand.		
Borax07	per lb.
Washing soda03	"
Chloride of lime10	"
Alum .....	.07	"
Paraffin or Spermaceti .....	.15	"
Beeswax (pure) .....	.35	"
Gum Arabic .....	.50	"
French ball blue or ultramarine .....	.25	"
Ammonia (pure) .....	.25	per qt.
Alcohol .....	.40	"
Kerosine .....	.15 to .00	per gal.
Hydrochloric acid .....	.10	" oz.
Acetic acid .....	.10	" "
Oxalic acid (crystals) .....	.05	" "
Starch .....	.10	" pkg.
Salt		Sewing materials
Sandpaper		Buttons
Bags for boards, line and pins		Pins and cushion
Bags for small articles in boiler		Scissors
Bags for lace curtains		Twine
Cloths for covers		Newspapers
" " scrubbing		Thin paper
Clock		Old sheets and flannel

DINING ROOM FURNISHING

Rug 9 x 12 ft	\$10.00 to \$100.00 up
Shades .....	.90 per window.
Table	6.00 to \$50.00 up.
Chairs, common	1.75 " 10.00 "
arm, high	3.00 " 15.00 "
Sideboard	15.00 " 50.00 "
Serving table	4.00 " 30.00 "
Table linen, 3 cloths	9.00 "
4 doz. napkins	10.00 "
2 carving cloths	2.00 "
Tableware (Dinner set, or its equivalent	12.00 to 40.00
stock pattern), semi-porcelain China	15.00 up
Glassware	2.00 "
Cutlery, knives, 1 doz. steel blades	3.50 to 8.00
Carving set	3.00 " 10.00
Silver-plated, quadruple	
knives per doz	3.50 " 6.00
forks " "	4.50 " 6.00
tablespoons " "	5.00 up
dessertspoons " "	4.50 "
teaspoons " "	3.00 "
Silence cloth 4.6 x 8	1.00
Average Estimate for small family, \$75.00 to \$150.00	

BED ROOM FURNISHING

Matting.....	\$10.00 up	
Rugs.....	5.00 "	
Shades and draperies (2 windows).....	3.00 "	
Enameled bed with spring.....	8.00 "	
Mattress.....	5.00 to \$50.00	
2 Pillows.....	5.00 up	
5 Sheets.....	2.00 "	
3 Pairs Pillow cases.....	.50 "	
4 Blankets.....	10.00 "	
2 Counterpanes.....	3.00 "	
Mattress cover.....	1.00 "	
Bureau.....	10.00 to	75.00
Washstand.....	4.00 "	25.00
Table.....	1.75 "	10.00
Rocker.....	2.00 up	
2 Chairs.....	3.00 "	
Couch.....	8.00 "	
Toilet set.....	3.00 "	
1 doz. Towels.....	.75 "	
4 Bath Towels.....	.50 "	
Average Estimate.....	\$60.00 to \$90.00	

KITCHEN FURNISHINGS

Floor
Covering

In selecting kitchen furnishings it will be found that a linoleum covering for the floor will give the greatest satisfaction, preferably one which is entirely plain or with a pattern which extends all the way through. Next to linoleum, a hardwood floor. An oilcloth is unsatisfactory, unless it be, perhaps, the best quality, for a small family which will not give it hard wear. A painted floor is hard to care for and is, in many respects, least desirable.

Stove

In selecting a stove a steel range is by far the most desirable, if possible. It is more expensive in first cost than a cast-iron stove, but this difference is more than offset by efficiency, economy of fuel and durability.

Utensils

Galvanized iron is the most desirable material for such utensils as coal hod, garbage and ash cans and

the like, being superior because of its light weight, durability and cleanliness.

A nickeled teakettle with copper bottom is very satisfactory for general use, costing about \$2.50. Aluminum ware is increasing in favor. Its price alone limits its use. The price of a teakettle is from \$2.25 up, but the aluminum teakettle wears a lifetime. Stransky ware is, next to aluminum, the most durable of any for cooking utensils. It is moderate in price, the teakettles being \$1.75 to \$2.25. Tin is very undesirable for almost all cooking utensils, as water and acids act upon the tin, forming unhealthful chemical compounds. For such uses as are allowable, one should buy block tin with rolled edge. The grade is readily seen by markings on the back. The cheapest is marked X, medium XX, best XXX or XXXX. Those tins which have fewest crevices and seams are best.

Sheet-iron bread tins with dull surface are excellent.

Woodenware should be used as little as possible, as it is difficult to keep it sweet, dry and free from odors and insect life. Bread and meat boards and chopping trays are usually of wood. These should never be cheap in quality, as the wood of such is soft and not well seasoned, so that it cracks and peels easily. Wooden spoons should be those designated as the French holly.

Glass or porcelain jars are excellent for spices and such articles as rice, tapioca, coffee, tea, etc.

Materials

Wooden
Ware



A MOVABLE KITCHEN CABINET, USEFUL WHEN THERE IS NO BUILT-IN CABINET.

These should be neatly labeled and conveniently arranged in order on shelves in a cupboard near the cooking table.

Iron for cooking utensils is almost a thing of the past. Although most durable, the weight is sufficient to banish it. Agate or Stransky have taken the place to a great extent. Agate ware has depreciated greatly in quality since first introduced. The best of it is more durable and safer than enamel ware. Sheet iron frying pans are best, as they endure the highest heat. Steel is next. Agate may be used for certain things.

Iron
Cooking
Utensils

Chairs should be tested for comfort. Wooden ones, if properly constructed, may be very comfortable. The shape and length of back, seat and legs greatly affect the comfort. A high stool is a strength saver when working at the table.

Chairs

Tables constructed for kitchen use are a great addition in modern furnishings. They are supplied with drawers for knives, spoons and such small utensils. Those of white wood are cheapest, pine being about 50 per cent more. The drawer increases the expense slightly, but this will not be grudgingly paid by one who has once enjoyed the advantage secured. The top should be unfinished, very smooth and even. It should be made of one piece of wood to avoid cracks. Oilcloth may be used as a covering, although less convenient because of the care necessary to avoid setting anything hot on it. Paint is altogether undesirable for the same reason.

Tables

TABLE AND BED LINEN, TOWELLING, ETC.

In buying cotton and linen material for the various needs of the house, one must consider the use to be made of it and select accordingly. Towelling suitable for glass and silver is not suitable for cooking utensils, and vice versa. If cast off garments, old bed linen and the like are thriftily cherished and preserved, much expense is saved and frequently better cloths secured than in using new. For scrubbing purposes a soft cloth that will not scratch is desirable, at the same time it must have a certain firmness and roughness for the friction necessary. One of the best materials for general purposes of this kind is the woven underwear. Outing flannel and "mill ends" are also excellent.

For drying, cloth with good absorbing quality is necessary. Cotton is undesirable, especially if new and not worn until softened. Linen is best for the purpose and is easiest to care for. It gives off less lint than cotton. Cheap qualities are less well prepared and scratch.

For dish towels, a medium light weight linen towelling is best, a still heavier for the china dishes, while a firm, heavy crash, like the Royal Russian, is serviceable for cooking utensils. The latter is also excellent for kitchen hand towels.

For washing dishes the small mops are excellent for glassware and are preferred by many for the

entire dish washing. They are inexpensive and are not difficult to keep sweet with proper care. Cheesecloth is very satisfactory for silver and glass.

Cheesecloth should be kept on hand for various purposes, as wiping meat, drying lettuce when washed, tying up fish to boil, straining soups and jellies, dust cloths and many other uses. It is easily cleansed, is soft and readily absorbent when old and is free from lint. For drying windows and lamps cheesecloth is excellent, or old napkins rough dried. Old cotton, as sheets and pillow cases, is fairly good.

Hand towels may be of crash, damask or huckaback. If the latter, the Scotch or Irish is the best. The choice of material depends upon individual preference of smooth or rough surface. The damask is soft, fine and smooth, the huckaback rougher. The Irish huckaback is woven with smooth dots for overthreads and is a fine grade. The Scotch is woven looser and is more showy. It is cheaper, but is good when washed. The damask toweling is a poor absorbent, because of its smooth, satiny surface. It is cheapest to buy huckaback by the yard and hemstitch it. Fringed towels should be avoided, as they are difficult to iron well and the fringe eventually wears off, leaving unsightly ends. If fringed at all it should be tied.

Turkish toweling of good quality is best for bath towels. Although cotton, it is so woven as to be readily absorbent.

BED LINEN

Sheeting

Sheeting was formerly woven in narrow widths only one yard wide, necessitating laborious seaming in the middle of a sheet. At the present time it is possible to secure sheeting woven for single, two-thirds or double beds, so that hems at top and bottom are the only needful sewing. Ready made sheets and pillow cases may also be bought in most places, less carefully made than home-made, but temptingly inexpensive, and conveniently ready for use. In providing in either way one should have the size of the bed carefully in mind and secure sheets and pillow cases ample in size.

Bleach

Cotton suitable for this purpose comes bleached, half-bleached or unbleached. The unbleached is two or three cents per yard cheaper than the bleached, and is more durable, this being due to the fact of chemicals being used in the process of bleaching which affect the fibre. This is, however, not often selected on account of the color. The half-bleached is less objectionable.

Brands of Cotton Cloth

There is considerable choice in the different brands of cotton. Among the best are the Wamsetta, Fruit of the Loom and Pequot.

Size of Sheets

For a full sized double bed, one should buy the 10 quarters width of sheeting, for a two-thirds width bed 8 quarters, and for a cot or single bed 6 quarters. Pillow casing will vary to fit the size of the pillow, 5

quarters or 45 ins. being a large size and 42 ins. medium.

The price depends upon the brand and size. The best Wamsetta in the 10 quarters width is 40c per yard, 5 quarters width 18c, while cheaper grades may be had at 28c for the 10 quarters width and 12 1-2c for the 5 quarters.

Price

Made sheets, entirely plain, in the best Wamsetta brand are about as follows:

90 in. x 99 in.....	85c
72 in. x 99 in.....	75c
Cheaper:	
90 in. x 99 in.....	75c
72 in. x 99 in.....	55c

The tubing for pillow slips, woven without seams, are about:

45 in.....	14c
42 in.....	13c
36 in.....	12c
Made up.....	15c each, up

The unbleached may be secured of Pequot cotton in the made sheets, largest size, 55 cents each.

TABLE LINEN

Most of the material sold as table linen is imported. Its manufacture has been attempted in this country, but the temperature is unfavorable, so that the result is an inferior quality.

Grades

There are three leading supplies—the Irish, Scotch and German, the Belgian, Austrian and French being

included under the latter. The Irish is considered the best and is most expensive.

Bleaching

The time of bleaching is a large factor in determining the value of the linen. Bleaching takes from the weight. The natural and best method is the grass bleaching in summer; next to that the snow. Artificial methods take from the strength of the fabric. It is difficult even for experts to detect the method. It is known by the times of coming into market. The grass bleached comes into the retail market about the middle of December, making this the desirable time to purchase.

**Hints on
Selecting**

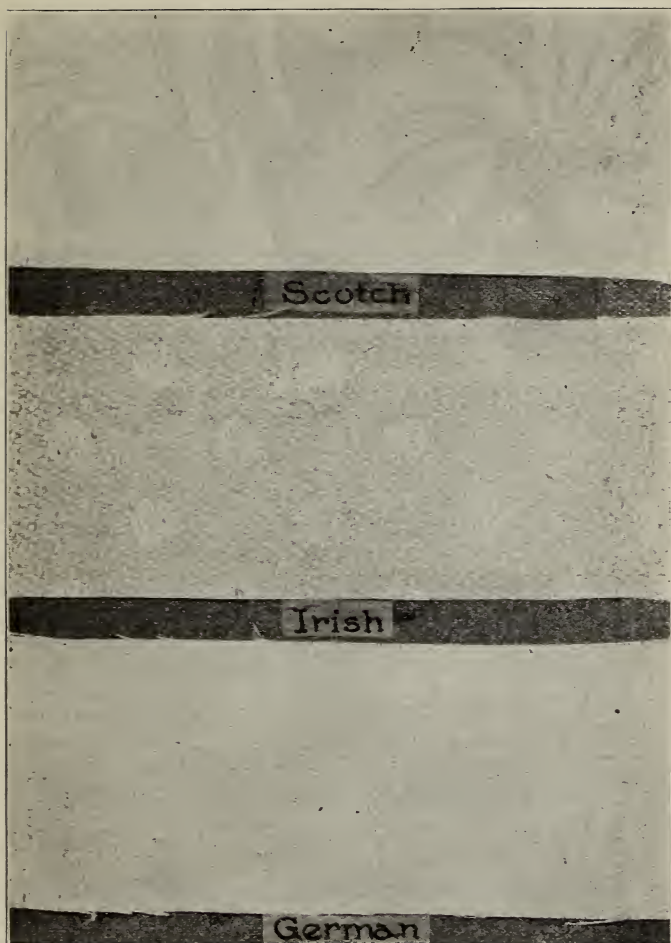
A fine thread damask may not be a superior wearing fabric. The weight is the criterion. The best fabrics are not too fine, firm but not stiff and heavy with starch. Those with a more elastic, leathery appearance are better. Those patterns are less durable which have long unbroken threads.

**German
Damask**

The German damask has a closer, harder twisted thread than the others, making it a very durable linen. The Germans cater less to variety of pattern and therefore produce less showy cloths, but they are very durable and are also less expensive.

Patterns

In selecting a pattern a medium-sized pattern, as the tulip is very satisfactory. It is a matter of taste to a great extent. Large patterns are more effective than small but the latter are good taste. Some patterns are so generally liked as to become stock patterns, as the snowdrop. These can be found in all stores. With



EXAMPLES OF TABLE LINEN.

Scotch Flower Pattern. Irish Snowdrop Pattern.
German Checkerboard Pattern.

other patterns only a few are woven and these are distributed to a few stores or a few of each to each store. The Scotch have excellent patterns, are finished about as well as the Irish and cost less.

In buying one should, if possible, have the exact measurements of the table on which a cloth is to be used. An average length is 2 1-2 yards, 1-4 to 1-3 yard should be allowed to drop at each end if the table be square. Two dozen napkins should be allowed for each cloth.

Size

Material may be purchased by the yard or in pattern lengths. The latter are 50-75 cents per yard more. The German linen runs from 50 cents to \$1.50 per yards. The Scotch in the bleached run from 50 cents to \$2.00 or over per yard. The Irish even in unbleached begins at 75 cents or \$1.00 per yard and may be \$2.50 or \$3.00. The latter are, of course, very beautiful goods, but for common use and durability a good quality may be secured for \$1.00-\$2.00 per yard.

Price

Napkins vary in size from 5-8, as they are termed at the store (17-22 in.) known as breakfast size, to 3-4 (23-27 in.) and 7-8 (29-31 in.), the latter being very large.

Napkins

There is less difference in the price of napkins in the different makes. In either the 20 in. napkins vary in price from \$1.75 per dozen up. Good ones are \$3.00-\$3.50 per dozen.

A heavy cloth, known as the silence cloth, is an essential accompaniment to a well appointed table. This

Silence
Cloth

may be of felt, or two faced cotton flannel or may be a quilted or knitted cloth on purpose.

Canton flannel, 54 inches wide, 50c yard; quilted, 54 inches wide, 62 1-2c yard; knitted, 62 inches wide, 75c yard give relative prices.

CARPETS AND RUGS

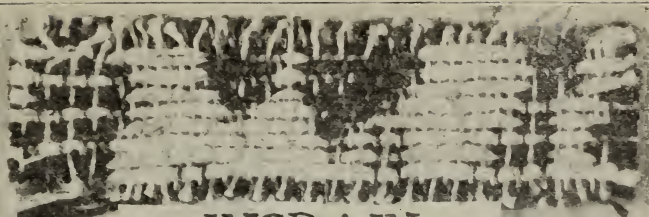
A square of carpet with a border of hard wood brought to a high polish, or even a painted border or denim or some similar material is preferable to a carpet covering the entire floor and tacked down. Besides the greater attractiveness it is much more cleanly, as this can be taken out of doors for frequent beating.

Grades

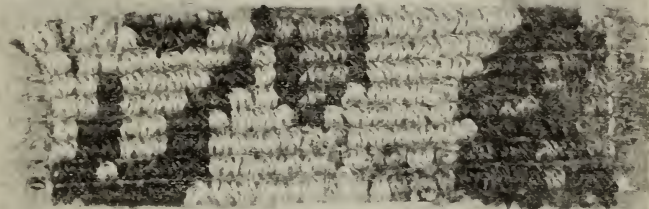
Of the different grades *Ingrain* is the cheapest. It is loosely woven, and although its wearing qualities are surprising considering the price, it is not the wisest choice for those who may choose. The dirt goes through it easily. Pleasing colors are difficult to secure as these carpets are colored with chemical dyes which are less soft and pleasing in effect than the vegetable dyes, which are used in the best grades. *Ingrain* carpeting is more suitable and serviceable for chambers than for living rooms. It is reversible.

Tapestry comes next in value, resembling *Brussels* on the right side but having a canvas back with colors on one side only. This wears fairly well.

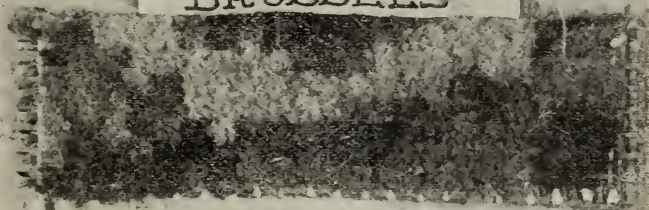
Brussels carpeting is heavy, with colors on both sides. It wears excellently well and generally proves best for ordinary use. The *Brussels* carpeting has an uncut-pile. Cut pile carpets are called velvet carpets, as



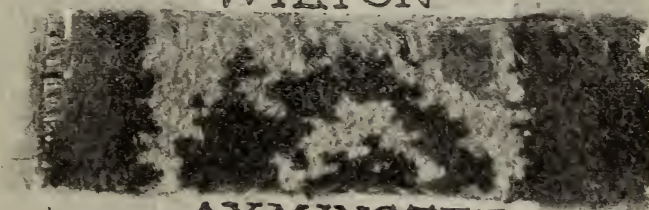
INGRAIN



BRUSSELS



WILTON



AXMINSTER

KINDS OF CARPET.

the Axminster and Wilton. The Wilton wear admirably well, and are very satisfactory in colors and patterns.

In buying by the yard the Ingrains are usually a yard wide, while Tapestry, Brussels and Velvets are but 3-4 of a yard. In practicing strict economy much may be saved by buying short lengths, small patterns or old styles.

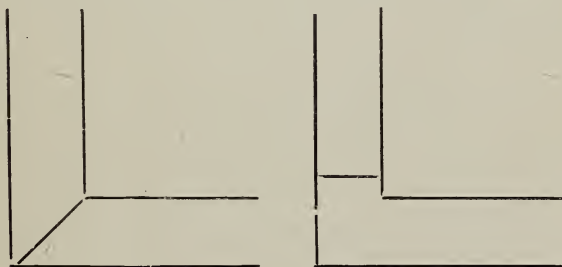
**Suggestion
for Buying**

Small patterns, sober colors and indefinite designs are more artistic, cheaper and more serviceable than the opposite. One should endeavor to secure a generally pleasing effect in a carpet so that the room for which it is designed will be made attractive without one's being especially conscious through what means the effect is produced. A carpet with striking pattern and color which arrests and holds attention is not pleasing.

**Patterns
and
Color**

Rugs or squares should not have borders seamed at the corners. The joining should rather be directly across, thus:

Rugs



**Re-made
Carpets**

A good old carpet can be utilized very satisfactorily by being re-woven by some of the reliable firms which have taken up the business. Even carpeting of different kinds may be used together in this way, if they are all-wool. A difference in color does not matter as the material is recolored as desired.

**Kensington
Squares**

Ingrain or Kensington squares, as they are often called, are more expensive when real and imported than the American squares. The price is by the yard. The usual size of 6 or 7 1-2x9 feet (2 or 2 1-2x3 yards) costs \$4.00 or \$4.75 up. By the square yard for carpeting a floor the Ingrain is 70-75c per yard.

Smyrnas

Smyrna rugs are alike on both sides and are very serviceable. They cost \$20 for a rug, 9x12 feet (9'x12'), \$8.00-\$9.00 for a rug, 2x3 feet (2'x3').

Wilton's are most nearly like the Oriental rugs, and are better than some cheap Persian rugs.

Persians

Persians, 6'x9' cost \$30.00 up indefinitely; Wiltons, 6'x9' cost \$22.00 up; 9'x16' cost \$36.00 up.

The prices given are not exact for all times and places, of course, but may serve as an indication of relative costs.

TEST QUESTIONS

HOUSEHOLD MANAGEMENT

PART II

Read Carefully. Place your name and address on the first sheet of the test. Use a light grade of paper and write on one side of the sheet only. Leave space between answers. Read the lesson paper a number of times before answering the questions. *Answer fully.*

1. What is the value of system in house work?
2. Outline in detail a system for the household with which you are most familiar.
3. Judging from your own experience, how long should it take to perform the daily tasks of house work, such as dusting the living room, washing the dinner dishes, sweeping a bed room, etc?
4. If you have employed servants, have you met with satisfactory results?
5. If so, what do you regard as the causes of your success?
6. Have you made any observations in general, of aid in the study of domestic service problems?
7. Do you know of any efforts among women to correct the situation, either as steps toward solution, or study of the situation?
8. What is your attitude toward non-resident labor in the home?

HOUSEHOLD MANAGEMENT

9. Taking into account fuel, supplies, and your own time and labor, what can you say of the relative cost and results of laundry work done in and outside the house?
10. What constitutes a legitimate bargain?
11. What elements aid the flourishing "bargain" counters of our stores?
12. What has been your experience in buying as to "the best is the cheapest?"
13. Give a list of what you regard as ten real and profitable conveniences in kitchen furnishing.
14. Give a similar list of uneconomical articles, because rarely used or not as useful as supposed when purchased.
15. What kinds of linen are there?
16. What are the advantages and disadvantages of rugs? Of carpets?
17. Add any suggestions arising from the study of this section.

Note.—After completing the test, sign your full name.

Household Management

PART III

LESSON PAPER

PREPARED BY

BERTHA M. TERRILL, A. B.

PROFESSOR OF HOME ECONOMICS IN HARTFORD

SCHOOL OF RELIGIOUS PEDAGOGY

AUTHOR OF U. S. GOVERNMENT BULLETINS

1905

American School of Household Economics

CHICAGO, ILLINOIS, U. S. A.

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AMERICAN SCHOOL OF HOUSEHOLD ECONOMICS

M Y S Y M P H O N Y



O live content with small means ¶ to seek elegance rather than luxury, and refinement rather than fashion ¶ to be worthy not respectable ¶ to be wealthy, not rich ¶ to study hard, think quietly, talk gently, act frankly ¶ to listen to the stars and birds, babes and sages, with open heart ¶ to bear all cheerfully ¶ to do all bravely, await occasions, hurry never ¶ in a word, to let the spiritual unbidden and unconscious, grow up through the common ¶ this is to be my symphony.

William Ellery Channing



ROASTS OF BEEF, NEW YORK MARKET.

From Photographs made for the Departments of Domestic Science, Columbia University.

HOUSEHOLD MANAGEMENT

PART III

MARKETING

A practical knowledge of marketing on the part of the housewife affects to a marked degree both the comfort and expense-book of the family. Intelligence and skill in buying are only secured by careful practice. The purchaser must not fear to ask questions. Most men with whom she will have to deal will be found to be patient, helpful, painstaking and reliable, yet she must make sure by sufficient trials that the cuts of meat, etc., recommended are, all things considered, those that are best adapted to meet the needs of her family.

Buying

It is usually greatly to one's advantage to select a regular place for marketing. Greater consideration is shown such customers and better satisfaction results. Time is saved, and usually it proves to be quite as economical, often more so. Disappointments are less liable to occur than in buying more generally.

**Regular
Customers**

The fact of buying regularly at the same place should not, however, lead to the erroneous idea that a telephone may be substituted for frequent visits to the market. This is a mistake which is increasing rapidly in America. Orders given in this way, by note,

**Use of
Telephone**

or to the driver at the door are liable to be less satisfactory than those which are given at the store where selection can be made by the purchaser. The telephone may be resorted to occasionally in emergencies, but should not take the place of regular visits. The greater satisfaction to be secured through personal selection, the greater variety secured by seeing otherwise unthought-of articles and the closer economy possible more than offset the additional time consumed.

**Reasonable
Time**

More than a single day's order may be given at a time. All orders needing prompt filling, as meats and vegetables, should be given in ample season, usually the day before, so that there may be sufficient time to fill the order without discomfort to those who serve. This is only reasonable consideration for others, besides securing for one's self the avoidance of disappointments which are very apt to occur when too limited time is allowed in filling the order. It is evidence of an inexcusable lack of foresight when a housewife plans so little beyond the immediate need as to leave the ordering of roast beef for a twelve-o'clock dinner until 10 o'clock of the morning it is desired.

**Supply
of Meats**

Meats are, perhaps, the most difficult to understand and to buy to advantage. A few years ago the supply of meats was practically all local, but at the present time only veal and lamb are supplied locally in places of any considerable size. The supply of beef and pork

for the United States is almost wholly from the West, Chicago being the chief center, especially for the wholesale beef trade. Some of the objections raised by those who oppose the consumption of meat because of supposed unwholesome and unsanitary conditions of killing, storing and transporting, are practically without foundation at the present time. Conditions have been greatly improved within the last few years and great sanitary precautions are exercised. The large houses of Chicago are rendered thoroughly sanitary and are carefully inspected by United States officers who also inspect every animal killed, and tag the meat for shipping. Each quarter is numbered, the car in which it is shipped is also numbered and a record made of the meat sent. In this way any complaints can be readily traced. The transportation is now done by the use of refrigerator cars.

BEEF

The quality of beef depends upon several conditions. The age of the animal when killed, the breed, the manner of fattening, the amount of exercise and the length of time the beef is allowed to cure before using, all effect the quality of the meat to a marked degree. The "prime" age of an animal for killing is 4 years, but the beef of a creature from 4 to 8 years of age is good. Beyond that age meat is apt to be tough and unsatisfactory. Although grass-fed animals are healthier than stall-fed, the latter is customary, or, at

Quality

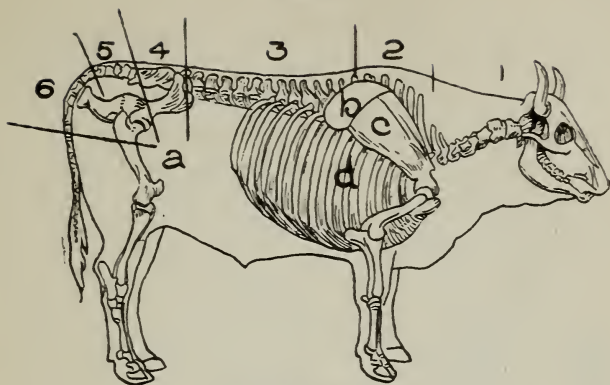
least, a combination of the two. Exercise toughens the muscles but if moderate, is considered desirable in rendering an animal healthier and the meat finer flavored. Beef has the finest flavor and is most tender when kept as long as possible before using. Three weeks is usually the shortest time allowed for this curing when conditions of storage are such as to permit.

**Texture
and
Color**

Meat should be selected which is firm and fine-grained. The color should be bright red, the fat yellowish white. The flesh and fat of old beef is darker, dry and coarser. Beef becomes dark through standing exposed to the air. One should distinguish carefully between a mere surface discoloration which may be trimmed off and the rest of the cut found to be entirely fresh and suitable to use, and the decomposition which gives a taint to the entire piece.

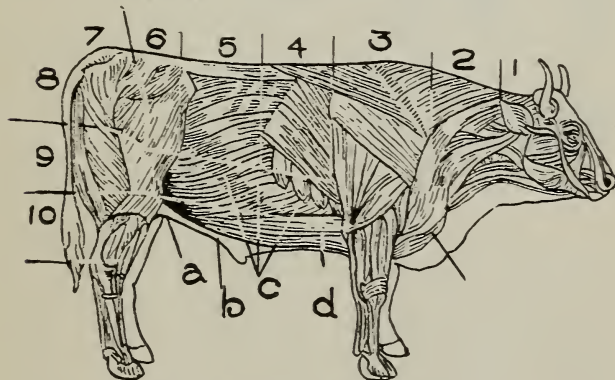
**Position
of Bones**

In buying, economy demands in general, that the amount of bone in a cut should be small in proportion to the amount of meat. In order to buy wisely and successfully it is necessary to have in mind a clear idea of the anatomy of the animal, also the muscle-fibre arrangement. These are seen in the beef in the illustrations. The vertebrae making up the backbone differ sufficiently so that with study one may recognize the different ones in the cuts of meat. The backbone is split in dividing the body into halves so that but one-half will be found in a joint of meat. Study the illustrations carefully.



SKELETON OF BEEF.

1, Neck; 2, Six Chuck Ribs; 3, Seven Prime Ribs and Loin; 4, Thick or Hip Sirloin; 5a, Top of Rump; 6a, Aitch Bone or Rump Piece; b, Cartilage; c, Shoulder Blade; d, Cross Ribs.

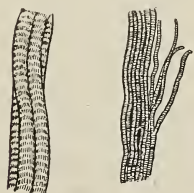


MUSCLE ARRANGEMENT OF BEEF.

1, Head; 2, Neck; 3, Chuck Ribs and Shoulder Blade; 4, Seven Prime Ribs; 5, Loin; 6, Thick Sirloin, called Boneless Sirloin in Chicago. Back of Rump in Boston; 7-8, Rump Piece in New York; 8, Aitch Bone; 9, Round; 10, Leg; a, Top of Sirloin; b, Flank; c, Plate; d, Brisket. (Redrawn from *Home Economics* by Miria Parloa.)

Arrangement
of Muscles

A knowledge of the muscle fibres and their arrangements is as important in buying, cooking and carving meat as familiarity with the location of the bones. The lean of meat is made up of muscular tissue. This consists of prism-shaped bundles, divisible under the microscope into minute tubes or muscle fibres. These fibres are held together in bundles by connective tissue which is readily distinguished by holding up a loosely connected piece of meat and noting the thin, filmy membrane. When meat is cut "across the grain" these bundles of fibres are severed and the ends appear. The membrane forming the walls of these tubes is very delicate and elastic.

*a**b*

Fibres of Meat.

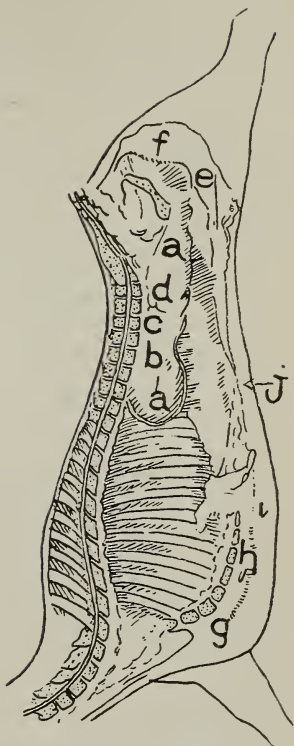
Carving

Carving has a great effect upon the apparent toughness of the cut of meat. In the accompanying illustration, *a* shows the muscular bundle, a fibre partially separated into its minute tubes, while *b* shows the fibre cut across the grain as it should be in carving. In this way the fibres are broken into smaller pieces as an aid to digestion and the contents of the tubes are set free, thus being more accessible for the digestive juices than when the meat is carved lengthwise of the fibres.

In cutting up a beef the body is first cut through the backbone laying it open in "sides" or halves. Each half is then divided into quarters, called the fore quarter and the hind quarter, as will be seen in the illustration. The muscle fibres run very irregularly in the fore quarter. This, together with the fact that they are coarser and have on the whole more exercise than those of the hind quarter to toughen them, renders the meat of the fore quarter of a less desirable, cheaper grade. The finest cuts of an animal come from the middle of the creature, in the most protected, least exercised parts, decreasing in value as they lie toward either extremity.

Cuts differ somewhat in different cities. According to the Boston cut, for instance, three ribs are left on the

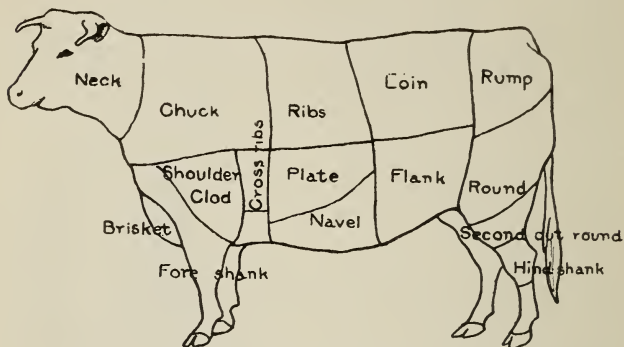
Cutting
Up



SIDE OF BEEF.

aa, Suet; *b*, Thin End of Tenderloin; *ad*, Thick End of Tenderloin; *e*, Inside or Top of Round; *f*, Best Part of Round; *g*, Sternum; *h*, Thick Brisket; *i*, Thin Brisket; *j*, Flank.

hind quarter, ten on the fore quarter. In New York all the ribs are cut on the fore quarter. Beef is best from a creature weighing 800 to 900 pounds.



CUTS OF BEEF ACCORDING TO THE U. S. DEPARTMENT OF AGRICULTURE.

Fore Quarter

Weight

An average fore quarter weighs about 200 pounds. It is divided into:

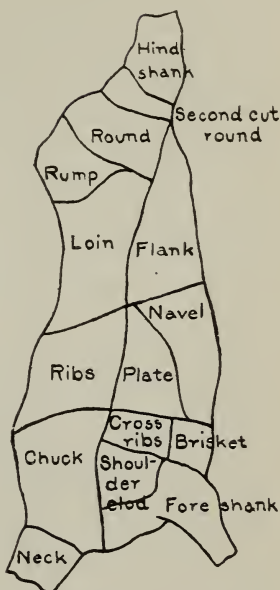
1. Neck.
2. Chuck.
3. Ribs.
4. Sticking piece.
5. End of ribs. } Sometimes called together
6. Brisket. } Rattleran.
7. Shin or shank.

The fore quarter as a whole being coarser is used chiefly for canned meat, stews, soup meat and corned

beef. The *neck* is best used for mince meat. Prices on all meats differ too widely to make it possible to state with accuracy for all places, but that we may be guided somewhat by price in estimating values, average prices will be given. For this cut 8 cents a pound is an average price.

The *Chuck* lies just behind the neck, including the first five ribs. This cut may be used in a variety of ways, as cheap steak, roast, pot roast or stew. Several of the cheaper cuts indicated as possible roasts or steak cuts were formerly used much more commonly than now for such purposes. As our country has grown more prosperous there has been a great increase in the demand for the better cuts until many markets are forced to buy extra loins, etc., to meet the demand. A very fair small one rib roast may be cut from this portion. The chuck sells for about 12 1-2 cents a pound.

The *Ribs* are used chiefly for roasts and constitute the best of the fore quarter. The portion lying nearest



SIDE OF BEEF, U. S. DEPT
AGRICULTURE.

The Neck

The Chuck

The Ribs

**First Cut
of the Ribs**

the hind quarter is very nearly the same in quality. There is a decided preference in the rib roasts. The "first cut of the ribs," as it is called contains the first two or three ribs from the hind quarter, differing according to the size of roast desired. Cut long, that is with the thin end pieces left on, such a roast brings as high as 17 to 23 cents a pound, while "cut short," that is with the thin rib ends removed, it sells in some places as high as 20 to 30 cents a pound. Following this cut are the second and third cuts, the third joining the first cut of the chuck. These are not as high in quality or price, 15 to 18 cents a pound. The second cut is a very good roast.

**Sticking
Piece**

The *Sticking Piece* is a cut between the neck and brisket, so called from the custom of bleeding there after killing. Although the fibre is coarse and tough in this piece it is an excellent piece when properly used. It is especially fine for beef tea, since for that, one should select as juicy a piece as possible. From the method of bleeding much blood collects in this piece and it is particularly juicy. It may be used for stews also where long, slow cooking renders the muscle fibre tender and sets free a portion of the rich juices.

**End of
the Ribs**

The *End of the Ribs* is often called the plate piece or rattleran. Although this portion has a liberal supply of bones they are thin, and generous allowance is made for that fact in the price. It is an especially desirable piece for corned beef if it is to be pressed

and served cold, as it has a good supply of fat blended with the lean and hardens to cut well.

The *Brisket* is much preferred for corned beef by some. It is a more solidly lean piece on the whole, thus carving better when hot. It is to a large extent a matter of choice as regards the amount of fat desired. There is a difference recognized at markets between the thick end of the brisket, called "fancy brisket," and the thinner end, the former being considered superior. The brisket corned brings as high as 15 cents a pound where there is good demand, while the rib piece is not over 8 cents, sometimes as low as 6 cents.

The
Brisket

The *Shin* is used for soup meat. It is divided into three pieces, more meat being found on the upper piece. Many make a great mistake in throwing away the smallest, most bony part supposing it to be valueless, which is far from true. It is rich in gelatin and those properties which are desired in soup stock. The shin usually sells for not over 5 cents a pound.

The Shin

The Hind Quarter

While there is a great variety in the possible cuts of the hind quarter they may be classed in general as follows:

- | | |
|-----------|-----------|
| 1. Loin. | 4. Shin. |
| 2. Rump. | 5. Flank. |
| 3. Round. | |

Cuts

Sirloin The location of these sections will be seen by consulting page 135. The entire loin is frequently called the "sirloin." The choicest steaks and roasts are cut from this part. The first two slices from the end where the loin joins the ribs are called the first cuts of the sirloin. These are not as tender or desirable as those which follow. After these are removed, the tenderloin begins to appear which lies on the under or inside of the loin and being so protected is very tender. The slices which include the largest portions of tenderloin are considered the best and bring the highest price. Some of these slices when trimmed bring as high as 35 or 40 cents a pound.

Tenderloin It would seem that the tenderloin is greatly overrated in some instances, since, except for the fact of its being especially tender, it is not more desirable. It is not as rich in juices or flavor as the rest of the loin. The entire tenderloin is used for what is known as a "fillet." When removed and sold separately for this purpose it costs as high as 60 cents to \$1.00 a pound since the remainder of the loin is rendered thereby far less salable. On the other hand, for one who wishes a delicious roast at moderate expense this loin with the tenderloin removed is very desirable.

Fillet In buying for a fillet roast it is far the wisest plan to buy the entire loin or section necessary to give the size desired, at 35 cents a pound, have the tenderloin removed for the fillet roast and the rest reserved for other uses, as steaks or later roasts. The thinner end



CUTS OF BEEF STEAK, NEW YORK MARKET.
 Courtesy of the Department of Domestic Science, Columbia University.

of the tenderloin which extends into the rump is cheaper, about 35 cents a pound. Some cheaper fillets are sometimes to be found in the markets but are not desirable, as they are from inferior beef.

The *Rump* lies back of the loin. As a whole it weighs about 52 pounds. It is divided into three sections, known as back, middle cut and face. This portion is sometimes called hip or thick sirloin. It may be used for steaks or roasts, while some of the less desirable parts are used for pot roasts, braising, etc. The part nearest the loin is termed the back; it is the best part for all uses except for steaks. Next to that, the middle, the face having more muscle.

The
Rump

A cut from the rump which is excellent for a variety of uses in the Aitch bone. It is satisfactory for a cheap roast, braising and the like. It weighs about six pounds usually and may be bought for 7 to 12 cents a pound. There is not enough bone included to offset the difference between this price and the 25 cents a pound which portions of the rump may bring, as the middle cut. The face makes a good piece for corning.

Aitch
Bone

The *Round* is divided into top and bottom, so called because of the way in which the leg is laid upon the block to be cut up. The outside, being laid down, is called the bottom round, while the inside, being on the top as it is laid down is called the top round. The difference in quality to be found between the two divisions is what would be expected from the rule stated earlier concerning the greater toughness of the

The
Round

more exposed and exercised parts of the animal. The bottom of the round being nearest the skin is the tougher and cheaper meat. The top round is used for a very fair quality of steak. The bottom round is better for braising, stews, etc. A vein divides the two sections so that it is easy to separate them. The top may bring 22 to 25 cents a pound, while the poorest parts may be secured for 12 1-2 cents.

Shin
and
Flank

The *Shank or Shin* is used as that of the fore quarter, for soup. The *Flank* is usually corned, selling for 7 to 10 cents a pound. It is a thin piece and has a good mixture of fat.

Summary of Cuts of Beef

Passing over the various cuts of beef in review, then, we may consider the cuts most desirable for the different methods of cooking which we employ in the order of their desirability, regardless of cost.

Small
Roasts

The selection of a roast of meat for a small family is the most difficult, since the larger the roast the better. Nothing smaller than a two-rib roast is very satisfactory to attempt to roast. Unless one is willing to roast less thoroughly the first day and reroast the second, or is willing to serve cold roast, the selection is very much limited. For such a family a rump fillet or Aitch bone is, perhaps, most satisfactory. The finest larger roasts are to be obtained from the first three cuts of the sirloin, and next to these the first cut of the ribs. Following these are the second and third

cuts of the ribs, the back of the rump and a chuck roast. A rib-roll is a roast prepared by removing the bones, rolling and tying. It is thus made easier to carve. If one has a roast prepared in this way, she should have the bones sent home to be used in the soup kettle.

There is little to be said in addition concerning the selection of cuts for steak, since in general meat that is especially desirable for roasts is equally good for slicing for steaks. The best is especially desirable here, since there is less opportunity to practice skill in cooking, which in other modes of preparing may avail greatly to improve an otherwise undesirable piece. It is not as pleasing to the majority of people to have meat served as steak unless it be fairly tender and juicy. In the main it is more satisfactory to those who should economize closely to rely upon other cuts, buying an occasional good steak for variety and especial luxury.

**Selection
of Steaks**

While it is true that the better the piece of meat the better the result as a general thing, it is possible and desirable to save expense to some extent where it may be done without serious loss. The meat to be cut for Hamburg steak need not be of the best, since it is rendered more digestible by the mincing. The top of the round is quite good enough, while the bottom round or even the shoulder and flank are used, although less satisfactorily.

**Cheaper
Cuts**

The top of the round, eighth to the thirteenth ribs. first cut of chuck, the cheaper of the rump cuts, the

**Braising
Cuts**

flank and leg may all be used for braising or pot roasts. By this method of cooking much is done to soften tough pieces, rendering them more digestible and acceptable, so that the cheaper cuts are made very palatable in the hands of a skillful cook.

**Corned
Beef**

The order of preference for corned beef might be, brisket, rump, piece from the chuck, plate, shoulder. Others would select the shoulder or chuck first for the reasons already mentioned. The flank is sometimes corned, but it is not considered a wise choice since it is not well protected by fat or bone as meat for corning should be to prevent the loss of the juices in the process of corning.

**Cuts for
Stews**

For stews it is desirable to extract some or all the juices from the meat. The meat is finely divided before cooking and the methods applied are those of slow, long cooking. The flank, leg and sticking piece are found to be very good for these purposes. Thus we find that all the animal may be used to good purpose in one or another of the ways indicated. The family that lives in the country and raises and provides its own supply finds it necessary to utilize all the parts. Those that depend on city markets are more ignorant of the different cuts and are as a result inclined to be much more extravagant, not having as wide experience in learning to prepare the cheaper cuts in an acceptable way.

**Beef
Heart**

Beef Heart is an economical and palatable meat. It is solid, and a good sized heart will serve fourteen

people. There is nothing to be feared in having some left, as it is even better to serve cold for a breakfast or supper dish than when hot. The most satisfactory way of cooking is to boil it three or four hours, cool, clean of coagulated blood, stuff and bake slowly for three hours. It may be braised or stewed. It is one of the most inexpensive meats, costing not over 5 cents a pound usually.

One should be very careful in using liver to determine that it is in a healthy condition, as it is an organ which is not infrequently diseased. It should be clear, smooth and without spots. Spots and streaks indicate a dangerous condition. Calf's liver is usually preferred as more tender and delicate, but the liver from good beef is cheaper and satisfactory. There is a great difference in it, some being hard and tough. Pig's is preferred by some. Calf's bring from 16 to 20 cents a pound, while beef's may be procured at from 8 to 10 cents.

Liver

Kidneys are cooked by some, although not as extensively as the organs already mentioned. They may be stewed or braised. Care should be used in selecting, as in liver. Calf's are preferred, next lamb's, mutton and beef. Those weighing from one to two pounds may be bought for 8 cents each.

Kidneys

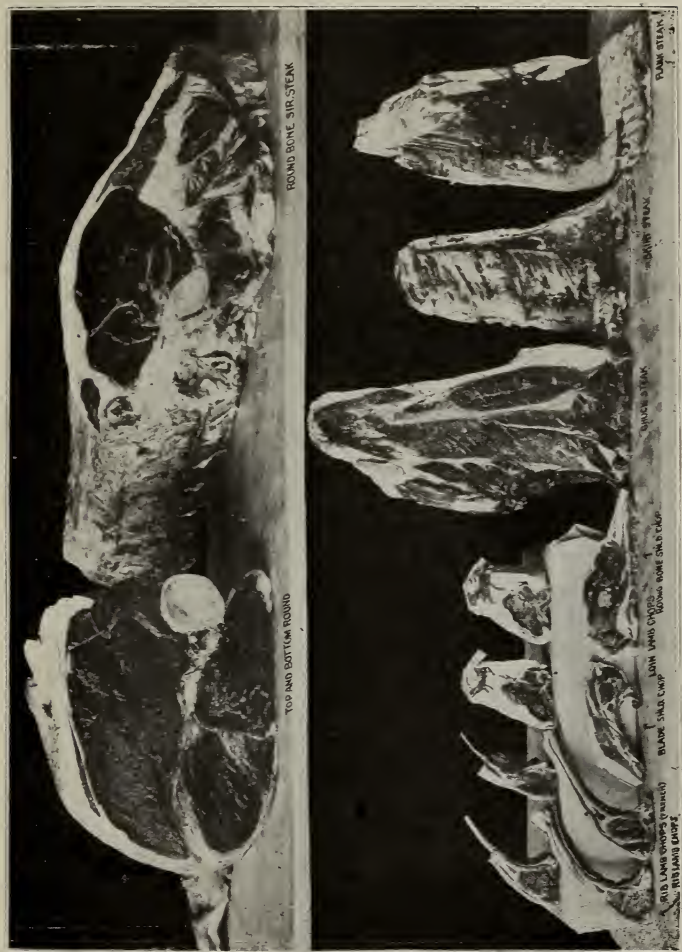
In selecting a tongue for cooking one should be chosen which is firm and thick, with plenty of fat, as the lean and flabby ones do not cook satisfactorily. Those of all animals are used, the beef more often, because of its size. They may be bought fresh, smoked

Tongue

or corned. Tongues weighing from four to six pounds may be bought at from 16 to 18 cents a pound.

Tripe Tripe is taken from the lining of the stomach of the animal. It is sold either simply cleaned or pickled. The honey-comb is the better. It is white and tender when taken from a healthy animal. The honey-comb costs about 10 cent a pound; the plain is a little cheaper. The cost of many of these things depends almost wholly upon the demand for them.

Sweetbreads Sweetbreads consist of the pancreas and thymus glands of the young calf or lamb which later in its life are absorbed or changed so as not to be edible. Those from a milk-fed animal are far superior, being white, firm and plump, while those from an improperly fed animal are dark, flabby and tough. They are generally sold in pairs. The pancreas is larger and better. They range from 25 or 35 cents to 50 or 75 cents a pair. What are known as Chicago sweetbreads may be bought in Eastern markets at times for \$1.50 a dozen. These are packed on ice. Where the demand for sweetbreads is great, pork sweetbreads are often substituted. These are coarse and dark colored. The buyer should learn to distinguish these from calves' sweetbreads and refuse them.



CUTS OF STEAK AND LAMB CHOPS.

Courtesy of the Department of Domestic Sciences, Columbia University.

Table of Cuts and Uses of Fore and Hind Quarters of Beef

FORE QUARTERS.

4 Ribs.....	Good roast.
6 Chuck Ribs.....	Small steaks, pot roast, stews.
Neck.....	Cheap Hamburg steak, mince meat.
Sticking-Piece.....	Mince meat, beef tea, stews.
Rattle Rand { Thick end { Second cut { Thin end	..... Corned, especially cold sliced.
Brisket { Navel end { Butt end or { Fancy Brisket	..... Excellent for Corning. Perhaps best.
Fore-shin.....	Soup stock, stews.

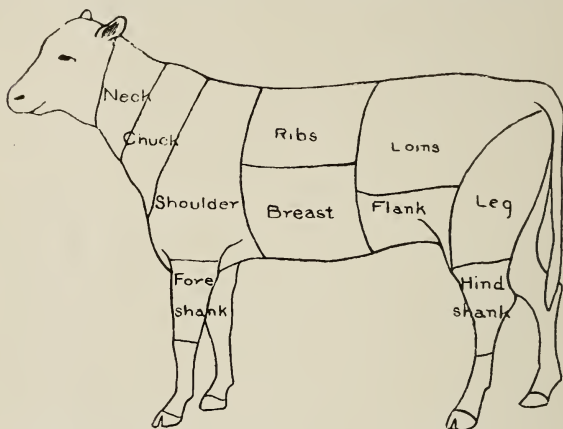
HIND QUARTERS.

3 Ribs.....	Excellent roast.
Loin { Tip.....	Finest roast, steaks.
{ Middle.....	Sirloin and porter house steak.
{ First cut.....	Roast and steaks.
Tenderloin { Fillet or { Steaks	..... Larded and roasted, or broiled.
Rump { Back.....	Best large roasts and cross-cut steaks.
{ Middle.....	Roasts.
{ Face.....	Inferior roasts and stews.
{ Aitch Bone	Cheap roast, corned, braised
Round { Top	Steaks, excellent for beef tea.
{ Bottom.....	Hamburg steak, curry of beef.
Flank.....	Stuffed, rolled and braised or corned.
Shin or Shank	Cheap stews or soup stock.

VEAL

Season
of Veal

While veal is in season all the year in many markets, it is best in spring and summer, being at its prime in May. The quality of the veal depends to a considerable extent upon the age and manner of feeding. Six



CUTS OF VEAL ACCORDING TO THE U. S. DEPARTMENT
OF AGRICULTURE.

Bob Veal

to ten weeks is the preferable age at the time of killing. When the calf is killed under four weeks of age the meat is injurious, so that it is not allowed to be sold, such being known as "bob veal." The flesh of such immature calves is soft, flabby and gelatinous, blue and watery in color instead of fine-grained, tender and white with a tendency to pink, as in the healthy meat. The meat is best of calves which have been fed entirely upon milk. Grass-feeding is the poorest of all.

In France an especially fine quality is secured by careful feeding, raw eggs being included in the feed.

The cuts of veal are similar to those of beef, except simpler. The fore quarter includes only five ribs and is so small that it is easily boned and rolled for a good sized roast. The entire fore quarter weighs 6 to 12 pounds, and costs 8 to 10 cents entire or with neck removed 10 to 14 cents. The neck can be used for stew. The head and brains are esteemed by many, the head being used for soup, and the brains cooked in various ways.

The loin includes all that is divided into loin and rump in the beef. This is an excellent roast, the leg alone being considered better. The leg is the choicest for roasts or for cutlets. The shoulder when boned,

rolled and stuffed makes a very acceptable cheap veal roast. The breast is good for stew. The "knuckle" of veal corresponds to the shin in the beef and is especially fine for soup, being highly gelatinous.

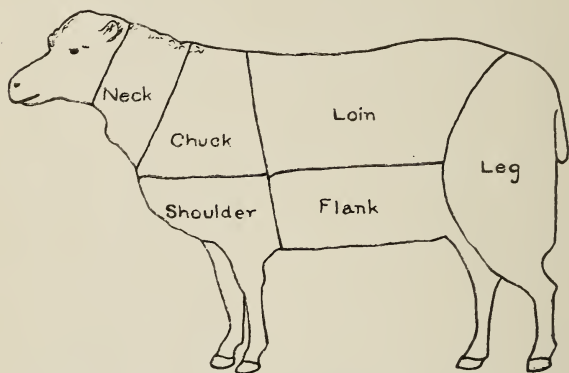
Cuts
Similar
to Beef



SIDE OF VEAL.

MUTTON AND LAMB

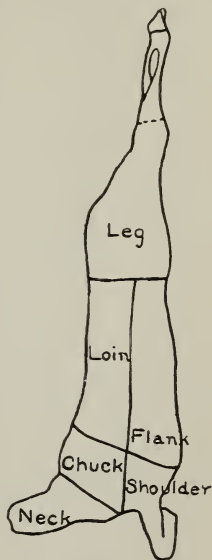
Mutton is, for most, a most nutritious and easily digested meat when of good quality and properly prepared, but it may be very uninviting through carelessness in cooking and serving. For this reason, no



CUTS OF LAMB, U. S. DEPARTMENT OF AGRICULTURE.

doubt, it is less in favor in this country than beef. Lamb is the name applied to the animal until one year old, after that it is properly mutton. The age is told by the bone of the fore leg, being smooth in the young animal but showing ridges which grow deeper and deeper with age. Mutton and lamb are in season the year round. The best mutton is from an animal not over 5 years old, plump with small bones. Like the beef long curing before consumption is desirable.

The usual cuts of mutton are the leg, loin, shoulder, neck, breast and flank. The leg is, all things considered, the best roast. The fore quarter, or the shoulder boned and rolled as in veal, is an excellent cheap roast, the choice depending on the size of the family. The ribs and loin may be used for roasts for a small family, but are more frequently cut into chops. The rib chops are smallest and, therefore, more expensive. They must, in fact, be regarded as a great luxury, considering the price and the proportion of bone, but they are much in favor for their delicious delicacy and fine flavor. The shoulder, breast, and best part of the neck are excellent for stews, pot pies or for boiling. The portion of the neck nearest the head is tougher and is best used for broth for which it is especially desirable, being rich in flavor and nutriment.

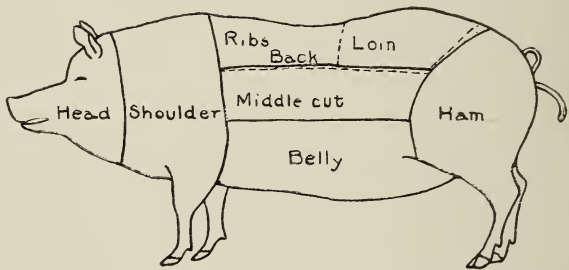


SIDE OF LAMB.

PORK

Season of Pork

Pork is good only in autumn and winter. A large part of the animal is so fat that instead of being sold fresh it is salted and sold as salt pork. The ribs and loin are the most desirable fresh cuts, being used either



CUTS OF PORK, U. S. DEPARTMENT OF AGRICULTURE.

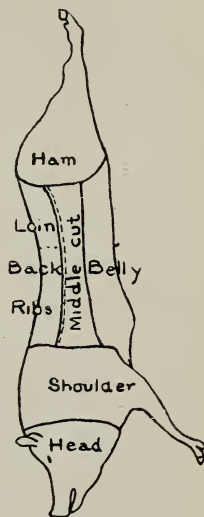
for roasts or chops. Care is needed to select a wholesome piece, suitable fresh pork having firm, clear and white fat and pink lean, while in the salted pork, one should select either a pinkish piece or one without color, a yellow appearance not being a good indication. A thick, mediumly fat piece of salt pork is better to buy than the thin flank pieces.

Bacon

Bacon is secured by smoking the fat pork in addition to the salting process. It is a most digestible form of fat and is enjoyed by many who do not care for

other forms of salt pork. It is somewhat more expensive, salt pork selling for 11 to 15 cents, bacon for 15 to 18 cents per pound.

Sausages are made either of pork alone, or beef and pork, or of veal and pork together. Those sold in the market are usually put up in skins. In buying sausage one should be especially careful to buy a known and approved brand. Otherwise they are an untrustworthy form of meat, as fragments of all kinds are easily disposed of in this way. The price of sausage varies from 12 to 20 cents per pound.



SIDE OF PORK.

Care in
Selecting

POULTRY

There is perhaps no other kind of meat in which there is more need of skill and care in selecting than poultry. Great care is necessary in handling, as the flesh easily becomes tainted or rendered unhealthful. Some states allow fowl to be kept for sale undrawn. This is not only a great menace to health, but a thing no thoughtful buyer will desire. The excess price charged for what are called Philadelphia Chickens comes from the method of killing and preparing for market. An improperly

drawn chicken is nearly as bad as one sold undrawn, in some cases may be even worse. The laws regulating the sale of poultry in New York state are such that in the majority of cases chickens and turkeys are most miserably prepared for market.

**Method of
Plucking**

The flavor of the flesh is also affected by the method of plucking, the dry picking being much to be preferred, although the appearance of the fowl may be less attractive. While scalding aids in removing the feathers it also affects the flavor, so that dry-picked sell at a higher price.

Tests

In young fowl and turkey the breast bone is soft, bending readily, and the flesh is smooth. Hairs over the flesh are an indication of age, pin-feathers of a young bird. The body should be plump and fat. A poor bird is bluish white, thin and often too liberally supplied with pin-feathers. Scaly legs are a further indication of age, the young having smooth legs. While the preference is always for chickens, especially for roasting, a good fowl may be thoroughly steamed before roasting and so rendered tender and very acceptable. It is much greater economy to buy fowl as one secures far more meat in proportion to bone, and fowl is considerably cheaper. The West has become a large source of our supply as in meat, especially in turkeys. Certain Eastern states like Vermont and Connecticut have acquired in the past an enviable local reputation, but at the present time a large part even of the Eastern trade is in Western turkeys,

shipped East in refrigerator cars. Methods of cold storage have advanced so far that turkeys may be kept a year or more, but not without losing in quality.

FISH

Fish deteriorates and becomes injurious sooner than any other animal food. Great care should be taken to select that which is strictly fresh. It is impossible to transport it a great distance and keep it as fresh as is necessary for health. For this reason it is not wise for those who live inland to rely upon this class of food, except such as may be secured from bodies of water near home. Fresh fish is firm, with no evidence of discoloration. Scales and eyes should be bright, gills red and fins firm. One should study the comparative value of the different varieties, as there is great difference in nutritive worth, largely due to the greater amount of fat in some, such as salmon.

Selecting

In general white fleshed fish has the oil confined in the liver and is therefore apt to be a little more digestible than the dark fleshed fish where the oil is distributed throughout the body. Note: Whitefish, halibut, etc.; salmon, mackerel and bluefish. There is a decided difference in texture, firmness and price.

Kinds

Haddock is an excellent cheap fish for frying, being firmer than cod. It is usually from 8 to 10 cents a pound. Halibut is the preference of the more expensive, costing from 14 to 18 cents. There is less waste in halibut, as the slices are from so large a fish that

Haddock

the head and tail are not included as in smaller fish. This should be taken into account in ordering.

Baking

Cod and bluefish are usually selected from the cheap fish for baking. Haddock is also good. The bluefish is preferred by most, being somewhat dry and of sweet flavor. It is always to be distinguished by a dark line running along each side from head to tail. While cod and haddock are in season throughout the year, bluefish are in season only from May to October except as they are frozen and kept in cold storage. A frozen fish is not as desirable as fresh, so that the season will govern choice somewhat. Halibut and mackerel are good to bake.

Boiling

In selecting fish for boiling it is desirable to secure a firm fish and a solid piece which can be wrapped in cheesecloth and cooked without breaking in pieces. Halibut and salmon are especially good for this purpose. Haddock is the best of the three cheaper fish already mentioned.

**Local
Varieties**

The fish already mentioned are those which are best as ordinarily found in the city markets. Many other varieties which are very delicious when freshly caught lose in flavor so much that it is not very satisfactory to try to serve them except when one may secure them strictly fresh. Trout, flounders and perch are examples. It is an excellent plan to have some system of tables showing the season of such foods as have a distinct season which can be hung on kitchen wall or other available place to show at a glance the most

desirable times to buy the various foods. For example, for fish :

The Season of Fish

Variety.	Price.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Season of Fish
Bass—Striped or black....	(To be filled in from local market.)													
Bluefish.....														
Butter.....														
Cod.....														
Flounders.....														
Haddock.....														
Halibut.....														
Herring.....														
Lobster.....														
Mackerel.....														
Perch.....														
Pickarel.....														
Salmon.....														
Shad.....														
Smelts.....														
Sword.....														
Trout.....														
Weak.....														
White.....														

The same general directions hold for buying shell fish. Clams, oysters and lobster are not suitable to be eaten unless strictly fresh and procured from sources of which the healthfulness of the supply is assured. Injurious preservatives are sometimes used in shipping to the middle and Western states. Clams and lobster may be purchased the year round. Oysters, scallops and shrimps are in season from September to March. Fish is not a substitute for meat in nutritive value, because it has less fat but makes a pleasant change for those who are able to purchase under favorable conditions.

Shell
Fish

VEGETABLES

Vegetables are classified according to their form as follows :

Roots and Tubers	{	Potatoes	Fruit Vegetables	{	Corn
		Turnips			Pumpkin
		Parsnips			Peas
		Beets			Beans
		Onions			Squash
		Radishes			Tomato
Salad Plants	{	Carrots	Flower Vegetables	{	Cucumbers
					Egg Plant
		Lettuce			Cauliflower
		Chicory			Cabbage
		Romaine			

Season
and
Prices

In buying one should watch the market for the season, as it will vary somewhat. Vegetables which were formerly confined very exclusively to their season are to be purchased now at almost any time in large city markets which are supplied by hot houses and by shipping from greater distances than was possible before methods of shipping became so superior as at the present time. Yet the higher prices which prevail for fruit and vegetables which are out of season prevent a great number from buying except when the prices are normal. Nor is this a thing altogether to be deplored. It is a great mistake to rely to any large extent upon such products since the quality is never equal to that of products grown under natural conditions, while the frequent use of a vegetable throughout the year takes away the keen enjoyment to be realized by those who are content to take each as its season brings it. Vegetables are a very important article of diet and should be liberally supplied at all times. For those who have learned to eat all varieties there

Liberal
Supply

is very fair variety of those which keep through the winter. The different varieties with season and average price will be found in the following table:

Season of Vegetables

Variety.	Price	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Artichokes.....	5c qt	.x.	....	....	....	....	....	....	....	....	....	....	....
Asparagus.....	15c pk.	....	....	....	....	.x.	....	....	....	....	....	....	....
Beets.....	5c b'nch	....	....	....	....	....	....	....	.x.	....	....	....	....
Cabbage.....	10c head	....	....	....	....	....	....	....	....	....	.x.	....	....
Cauliflower.....	10c "	....	....	....	....	....	....	....	....	.x.	....	....	....
Carrots.....	3c b'nch	....	....	....	....	....	....	....	.x.	....	....	....	....
Celery.....	8c head	....	....	....	....	....	....	....	....	....	....	.x.	....
Chicory.....	16c "	....	....	....	....	....	....	....	....	.x.	....	....	....
Corn.....	8c doz.	....	....	....	....	....	....	....	.x.	....	....	....	....
Cucumbers.....	2c each	....	....	....	....	....	.x.	....	....	....	....	....	....
Egg Plant.....	10c "	....	....	....	....	....	....	....	.x.	....	....	....	....
Greens—													
{ Beet.....	15c peck	....	....	....	.x.	....	....	....	....	....	....	....	....
{ Dandelion.....		....	....	....	....	....	....	....	....	....	....	....	....
Mushrooms.....	30c lb.	....	....	....	....	....	....	....	.x.	....	....	....	....
Okra.....	40c hun.	....	....	....	....	....	....	....	.x.	....	....	....	....
Onions.....	15c peck	....	....	....	....	....	....	.x.	....	....	....	....	....
Oyster Plant or													
Salsify.....	15c b'nch	....	....	....	....	....	....	....	....	....	....	.x.	....
Parsnips.....	3c lb.	....	....	....	....	....	....	....	....	....	.x.	....	....
Peas (fresh).....	10c peck	....	....	....	....	....	.x.	....	....	....	....	....	....
Potatoes—													
Sweet.....		....	....	....	....	....	....	....	....	....	....	....	....
Irish.....	75c bu.	....	....	....	....	....	....	....	....	.x.	....	....	....
Pumpkins.....	2c lb.	....	....	....	....	....	....	....	....	.x.	....	....	....
Radishes.....	3c b'nch	....	....	....	....	....	....	....	....	....	....	....	....
Rhubarb.....	2c lb.	....	....	....	....	....	....	....	....	....	....	....	....
Romaine.....	10c head	.x.	....	....	....	....	....	....	....	....	....	....	....
Spinach.....	15c peck	....	....	....	....	.x.	....	....	....	....	....	....	....
Squash—													
Summer.....	3c each	....	....	....	....	....	....	.x.	....	....	....	....	....
Winter.....	2c lb.	....	....	....	....	....	....	....	....	....	....	....	.x.
String Beans.....	10c qt.	....	....	....	....	....	....	....	....	.x.	....	....	....
Tomatoes.....	5c qt.	....	....	....	....	....	....	....	.x.	....	....	....	....
Turnips.....	2c lb.	....	....	....	....	....	....	....	....	....	....	.x.	....

X marks the height of the season, or when it is at its best.

The prices given are the lowest, or those at the height of the season.

Quantity
for Serving

It is sometimes puzzling to determine the quantity to order for the number of persons to be served. The following estimates may be a guide:

Artichokes, 1 quart.....	will serve 2 people.
Asparagus, 1 bunch	" " 4 "
Beets, 1 bunch (5)	" " 6-8 "
Cabbage, 1 good, solid	" " 8 "
Cauliflower, 1 small	" " 4-6 "
" " good size	" " 8 "
Carrots, 1 large one	" " 2 "
" " small bunch	" " 4 "
Celery, 1 head (3 bunches)	" " 8-12 "
Chicory, 1 head	" " 4 "
Corn, 1 doz.	" " 11-12 "
Cucumber, 1..... (in salad) ..	" " 4 "
" " " (sliced) ..	" " 2-3 "
Egg Plant, medium	" " 6-8 "
Greens, 1 pk	" " 6-8 "
Onions, 1 qt.	" " 4-6 "
Oyster Plant, 5 stalks.....	" " 6-8 "
Parsnips, 2 (1 lb.)	" " 4-6 "
Peas, 1 pk	" " 4-6 "
Radishes, 1 bunch	" " 4-6 "
Rhubarb, 1 lb. (in sauce) ..	" " 6 "
Romaine, 1 head	" " 4-6 "
String Beans, 1 qt.	" " 4 "
Tomatoes, 1 qt. (5)	" " 6 "
Turnips, 1 (2½ lbs.)	" " 4-8 "

Selecting
Vegetables

All vegetables should be fresh, as it is very difficult to cook those that are wilted and they lose much in flavor. Greens and salad plants should be crisp and tender without evidences of lying until bruised and partially decayed. Cabbage and cauliflower should have solid heads and not be discolored. Medium-sized vegetables are preferable to either extreme, usually. If small there is large waste, while too large ones are apt to be coarse and woody in texture. This applies especially to beets, parsnips, peas, beans, rhubarb, etc. The heavier potatoes are in proportion to their size the better, but medium sized ones are less likely to have hollow hearts. The varieties differ greatly as

to quality. One must, in general, learn by trial the best to be obtained in the local market. The Early Rose is an excellent variety.

In selecting pumpkins choose a heavy one with hard shell and deep yellow color. Of winter squashes, the dark green Hubbard is the best. It should be very hard and good sized. The crooked neck is the best variety of summer squash. The evergreen and country gentleman are excellent varieties of sweet corn. Spanish onions are the best, being more delicate than native but are somewhat higher in price.

Squashes
and
Pumpkins

ANIMAL PRODUCTS

Butter, milk and eggs are all of a nature to require the utmost care in purchasing and in storing before use. They are easily tainted so as to be spoiled for one of sensitive taste, while milk, especially, is probably the most frequent transmitter of disease, with the exception of water, of all our foods and drinks. Butter should be of the best, but a high price is not always a test of merit. While some creamery butters bring a very high price and take high awards for flavor, so that creamery butter as a whole commands a higher price than dairy butter, it is not the most desirable. All good creameries maintain a high sanitary standard and conditions under which the butter is made are doubtless superior to those in the majority of private dairies, yet one must go back of the creameries to the farms from which the creameries are supplied to determine the final healthfulness of the product. It is

Butter
Milk
Eggs

here that the difficulty lies with creamery butter, since the farmers that keep the poorest cows and who do not understand dairying under right conditions are those that supply the creameries, so that one cannot be sure that butter made from the cream produced under such conditions is healthful. It is far better, so far as is possible, to buy from an approved private dairy.

Source
of Milk
Supply

The same may be said of the milk supply. One should follow to its source and know without a question that there can be no pollution if any milk is consumed in a raw state by the family. This becomes doubly imperative where there are children in the family. If necessary, a cent or two more in price per bottle is little for the sake of safety.

Eggs are highest in price in winter. A housekeeper may take advantage of low prices in the spring or fall by buying a supply in advance, but she cannot do this unless she can be sure of a cool place to store them and is willing to take the trouble to coat each egg over so that the air may not penetrate the shell. Wrapping each in separate paper is a fairly good protection. Care must be used not to use anything that will cause an unpleasant flavor, as the shells are very porous and the contents readily acquire odors of anything near. A 10 per cent solution of silicate of soda is an excellent preservative.

Testing
Eggs

A salt solution is a good test of the freshness of an egg. Two tablespoonfuls of salt for a quart of water may be used. If fresh, the egg will sink in it; if not

perfectly fresh, will show signs of rising, while a bad egg will float at once.

DRY GROCERIES

While most of what has been discussed in the previous pages relates to food which must be purchased as needed, because perishable, there is a class in buying which much time and thought may be saved by supplying enough for at least a month in advance. This is dry groceries such as sugar, flour, cereals, flavorings, coffee (unroasted), tea, chocolate, spices, soap, starch, and all like necessities.

A store-closet large enough to allow the purchase of these things at a wholesale store, and so arranged as to temperature, dryness, light and ventilation as to keep them in perfect condition is a saving so great as to astonish one who tries the method for the first time. Often the difference amounts to twenty per cent.

Storage

Sugar should be bought by the hundred weight at least, flour by the barrel, canned goods by the dozen or better by the case, cereals by the dozen packages after the fresh fall supply is in, vanilla by the quart (at the drug store to secure better quality), baking powder by the 5-pound box from which smaller quantities are transferred as needed to the box in use, soap by the box, that it may have a chance to dry out thoroughly and so waste less readily, and so on through a long list. For a very small family the list would naturally be shorter. Anything that does not deteri-

Quantities

orate in storage can be bought to much greater advantage in quantity.

**Brand
of Goods**

In groceries it is not well to buy an inferior grade. Here the best is the cheapest and wisest, especially in these days of intense competition and fraud. It is well to know a good brand and insist upon having it. Foreign labels are not a surety of a good grade of goods, in fact some of our best American firms put up their best quality of spices, for instance, under their own name and the poorer grades are labeled with French labels and sold to firms that deal in a cheaper line of goods.

Adulterations

Through the reports of the Government upon adulteration as given in the Bulletins and the report of different state and city inspectors one may ascertain to some extent which are reliable and which are not.

CONCLUSION

**Percentage
in Saving**

The household manager should learn to think in percentages. One cent less on a ten cent article seems a trivial saving, yet it is ten per cent—ten dollars in every hundred. It is fair to state that there will be a difference in money paid of from ten to twenty per cent between careless and careful purchases.

It should be remembered that the customer who *knows* and is particular receives the best of goods and services.

Judgment

The successful business man is an expert in judging the materials in which he deals; he is perfectly familiar with the range of prices and quick to take advantage

of all favorable conditions. The household manager needs to be just as familiar with all the goods which relate to the home and with their prices.

One becomes an expert only through experience, but experience is not gained simply by ordering goods; appearance must be noted carefully and results compared intelligently to acquire the trained eye and the trained judgment necessary to the successful household manager.

**The Expert
Household
Manager**

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TEST QUESTIONS.

HOUSEHOLD MANAGEMENT

PART III

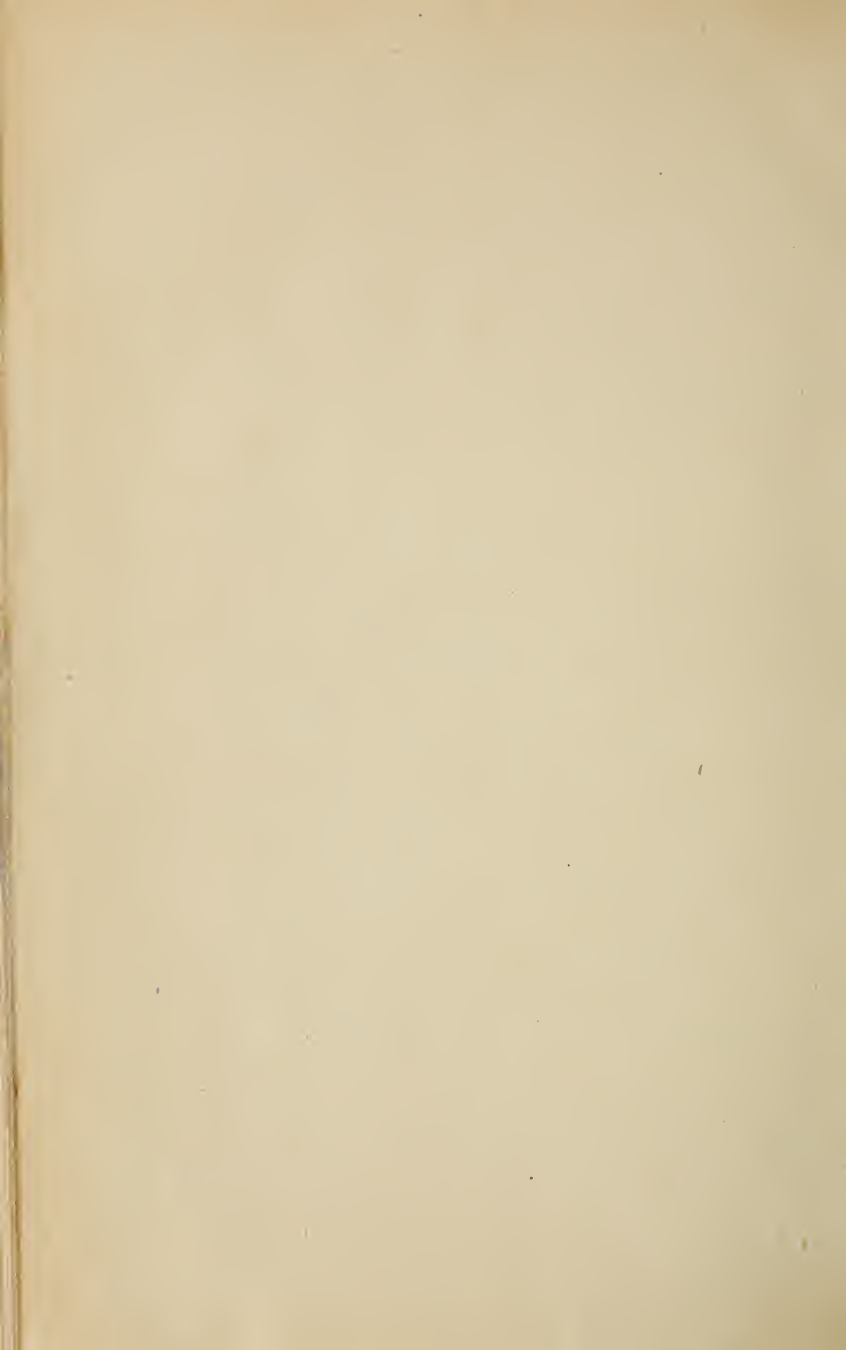
Read Carefully. Place your name and address on the first sheet of the test. Use a light grade of paper and write on one side of the sheet only. Leave space between answers. Read the lesson paper a number of times before answering the questions. *Answer fully.*

1. What factors combine to make meat suitable for the table?
2. (a) By what should one be governed in selecting a cut of beef? (b) What cuts have you found especially satisfactory?
3. How is a side of beef cut up in your own market? What are the prices?
4. Describe the "bottom round," stating its location in the animal, quality, suitable uses, approximate value, etc.
5. Compare with "top round."
6. Compare a cut from the brisket with the flank cut.
7. What cuts of beef have you never used?
8. Have you any especially satisfactory methods of preparing cheap cuts, other than noted in these books?
9. Describe a desirable piece of salt pork.

HOUSEHOLD MANAGEMENT

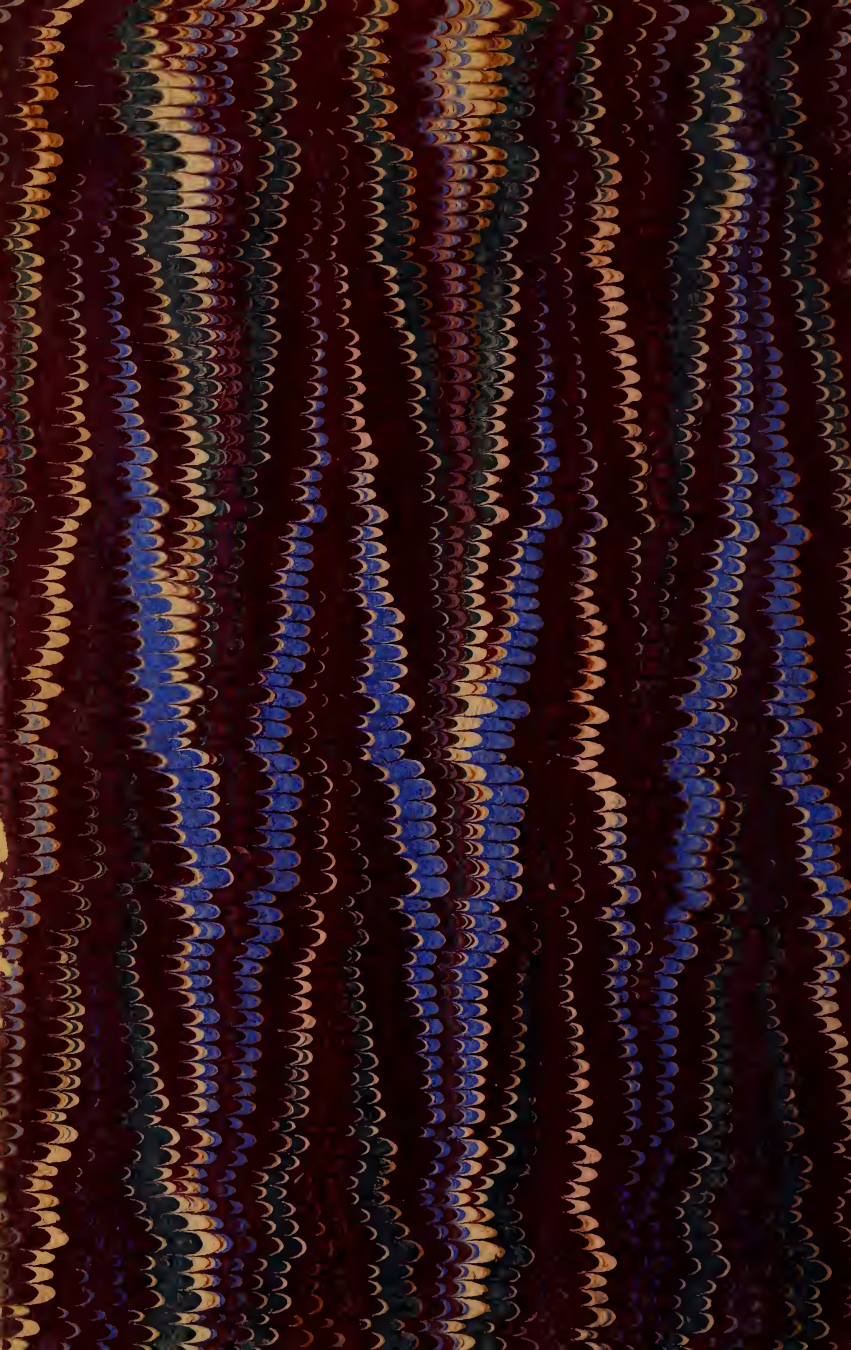
10. A satisfactory fowl to roast.
11. A satisfactory roast of pork.
12. The best cut of steak.
13. French lamb chops.
14. What objections are there to canned meats?
15. Compare fish with meat as a food.
16. Make a table giving the season and prices of vegetables to be obtained in your local market similar to that on page 137.
17. State objections for excessive use of vegetables out of season.
18. What answer would you give a mother who states that her children like no vegetables except canned tomato, preferring it to the fresh fruit even in season, and asks if there is any harm in letting them have it exclusively, every meal?
19. Have you tried buying any groceries in quantity? If so, with what success in price, quality, and keeping?
20. What purchases do you find hardest to make? Why?
21. Can you add any suggestions or comments to help others?
22. Are there any questions you would like to ask relating to Household Management?

Note.—After completing this test, sign your full name.









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LIBRARY

NOTICE TO BORROWERS

Please return all books promptly after finishing your use of them, in order that they may be available for reference by other persons who need to use them.

Please do not lend to others the books and periodicals charged to you. Return them to the Library to be charged to the persons who wish them.

The mutilation, destruction, or theft of Library property is punishable by law. (20 Stat. 171, June 15, 1878.)

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